Internet Survey Results on the Effects of Fuel Economy Labels on Understanding and Selection

Prepared by

PRR Inc.

November 2010

Internet Survey Results on the Effects of Fuel Economy Labels on Understanding and Selection

Summary

This report presents the results of a survey conducted on three fuel economy label designs proposed by the U.S. Environmental Protection Agency and the National Highway Traffic Safety Administration.[1] Each respondent saw only one label design and was asked to compare conventional and advanced technology vehicles based on the information in the presented labels.

The "understanding" questions asked respondents to identify the "better" vehicle for specified trips. Overall, the differences between the three label designs with respect to understandability are small.

The "selection" questions asked respondents to identify which vehicle s/he preferred to buy, if vehicles were identical except for the information on the labels. Overall, the vehicle selection differences between the three label designs are small.

Methodology

Survey question development and pretesting

The survey questions were developed by PRR, Inc. and the EPA, with input from NHTSA (National Highway Traffic Safety Administration) and OMB (Office of Management and Budget).[2] The survey questions were pretested in seven cognitive interviews.

A total of six different versions of the survey were used. These six versions differed only in regard to:

- Which of the three label designs was presented in the survey
- The order in which the labels were presented in the survey questions (to control for stimulus order effects)

Sampling and survey implementation

Two sources of new vehicle buyers were used:

- those who requested a price quote from a dealer (Autobytel, http://www.autobytel.com) and who indicated that they had purchased a new vehicle (120,000 contacted; response rate < 1%))

---

[1] Environmental Protection Agency and Department of Transportation, "Revisions and Additions to Motor Vehicle Fuel Economy Labe; Proposed Rule," Federal Register 75(184) (September 23, 2010): 58078-58202.

[2] Drafts of the survey were reviewed by Dr. Clay Voorhees of Michigan State University and Dr. Randall Pozdena of ECONorthwest, former vice president of the Federal Reserve Bank of San Francisco.

- the *e-Rewards*™ panel[3] of new vehicle buyers (12,025 contacted; response rate about 25%)

The survey was conducted September 8-22, 2010.

Data Management and Analysis

The data from all versions of the survey were merged into one database for analysis purposes. Those who indicated that they had not purchased a vehicle were dropped from the final database. In addition, the time that it took respondents to complete the survey was calculated. Any respondent who completed the survey in less than five minutes was considered to have "blown through" the survey (i.e., could not have read/considered the questions carefully enough to provide valid information) and was dropped. Finally, response range and logic checks were performed in order to identify any miscoded variables. The final data set for this analysis (n = 3,169) consists of respondents overwhelmingly from the e-Rewards panel, but it includes some respondents from Autobytel.[4] PRR, Inc., conducted the data analysis, with assistance from ECONorthwest.

A comparison of respondent demographics across the six versions of the survey indicated no statistically significant differences, except that age for those who viewed the Label 3 design was slightly older than those who viewed the other two label designs. Respondents came from all fifty states and the District of Columbia.

The key questions on the survey examined people's "understanding" of the labels and the variation in "selection" between vehicles when people saw different label designs. For both these kinds of questions, respondents were shown labels of the same design but for different hypothetical vehicles (different technology, fuel economy, costs, etc.). In the "understanding" questions, respondents were asked which vehicle was "better" for a specified distance. The "selection" questions asked which vehicle the respondent would prefer to buy if all vehicle characteristics other than those on the label were the same. This memo provides the results of these questions.

---

[3] The e-Rewards panel (part of *ResearchNow*™ http://www.researchnow.com/) is among the most highly rated of such online survey panels, and has a global automotive panel of over 1.5 million panelists. Respondents are paid a small fee ($1.25) for completing surveys. A number of government projects have used e-Rewards panelists, including but not limited to surveys conducted for the United States Department of Homeland Security and the United States Department of Defense.

[4] The responses include 191 people who self-identified as intending to buy a new vehicle, rather than having bought a new vehicle. These people came from the Autobytel database, as there were no "intenders" in the e-Rewards panel. Because intenders were found to be demographically different from buyers (e.g., more male, older, less wealthy), the intenders were excluded from the analyses presented here. Including intenders might affect the results, without sufficient numbers of them to identify what effects are associated with intenders vs. buyers, or to separate the demographic effects from differences in preference between intenders and buyers. The results presented here thus reflect the preferences only of buyers. Due to omission of an identifier in the e-Rewards panel responses, the buyers from the Autobytel panel cannot be distinguished from the e-Rewards panelists. They are likely to be a small enough number that they will not significantly affect the results.

The labels presented in the survey are based on hypothetical vehicles and are not intended to reflect the performance of any specific vehicles. The results of these surveys are not intended to be representative of any larger group of new vehicle buyers and reflect only the experiences of those who completed the survey.

Topline 'Understanding' Question Results

Respondents' *understanding* of the labels was tested by showing them a series of label pairs for hypothetical vehicles (see Appendix 1, Understanding Questions (UQ) 1-6). In each pair, respondents were asked to identify which vehicle was better to use for trips of specified distances. "Better" was chosen as the comparison word, rather than "more fuel-efficient" or "less costly," to allow respondents to decide on their own what information on the label they would use. Answers may therefore reflect individuals' idiosyncratic attitudes and assumptions; as a result, "incorrect" answers may result for reasons other than the information on the labels. Because those idiosyncrasies are expected to be distributed randomly across the label designs, differences in responses across label designs are expected to be due to the label designs. EPA has chosen to define the objectively "better" answers to these questions based on fuel cost, fuel economy, GHG emissions, and vehicle range and will identify this as the "correct" answer for purposes of the discussion below. Responses of "Both are equally good" are included in the "incorrect" answers.

Below we have presented the results from each label pair, preceded by a brief description of some of the key metrics shown on each label. Two questions were asked for each label pair: which was "better" for a short distance (20-30 miles), and which was "better" for a long distance (120 miles).

The results indicate large differences in the proportion of "correct" answers from question to question, as either the driving distance or the vehicle technologies changed. Limited understanding of advanced technology vehicles may contribute to incorrect responses to these questions. The differences in "correct" answers across label designs in response to any individual question are much smaller than the differences from question to question.

Pair #1
Key Metrics:

- **Vehicle A: Gasoline, 30 mpg, $1400 annual fuel cost**
- **Vehicle B: Electric, range 100 miles, 98 mpge, $616 annual fuel cost**

Understanding Q. 1: Which vehicle is better for a round-trip of 30 miles?

Q: Which vehicle is better for a round-trip of 30 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 30 miles?	Vehicle A	Count	177	89	96	362
		% within Label Type	20.0%	11.6%	9.1%	13.4%
	Vehicle B	Count	622	602	873	2097
		% within Label Type	70.1%	78.4%	83.1%	77.5%
	Both are equally good	Count	88	77	81	246
		% within Label Type	9.9%	10.0%	7.7%	9.1%
Total		Count	887	768	1050	2705
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The “correct” answer is B, due to the higher efficiency and lower operating costs of the electric vehicle.

In this comparison, regardless of label design, respondents gave a high proportion of “correct ” answers. Average “correct” response was 77.5%, with the proportion of “correct” responses across label designs varying from 70% to 83%.[5]

Understanding Q. 2: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	468	402	512	1382
		% within Label Type	51.5%	52.4%	48.2%	50.5%
	Vehicle B	Count	378	308	483	1169
		% within Label Type	41.6%	40.2%	45.5%	42.7%
	Both are equally good	Count	62	57	67	186
		% within Label Type	6.8%	7.4%	6.3%	6.8%
Total		Count	908	767	1062	2737
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The “correct ” answer is A, because the range for the electric vehicle is less than the trip distance.

In this comparison, all three labels produced a large proportion of “incorrect ” answers compared to the answers for the 30-mile range. Average “correct” response is 50.5%, with the proportion of “correct” responses across label designs varying from 48% to 52%.[6]

Pair #2
Key Metrics:

- **Vehicle A: Extended-range electric (EREV):**
  - **All-electric: range 30 miles, 90 mpge, $672 annual fuel cost**
  - **Extended range: 32 mpg, $1,313 annual fuel cost**
- **Vehicle B: Plug-in hybrid electric (PHEV):**
  - **Blended: range 30 miles, 65 mpge, $734 annual fuel cost**
  - **Extended range: 54 mpg, $778 annual fuel cost**

Understanding Q. 3: Which vehicle is better for a round-trip of 20 miles?

[5] Statistically significant: Cramer’s V = .132, p = .000
[6] Statistically not significant: Cramer’s V = .037, p = .154

Q: Which vehicle is better for a round-trip of 20 miles? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle is better for a round-trip of 20 miles?	Vehicle A	Count	354	395	488	1237
		% within Label Type	38.9%	52.1%	46.3%	45.5%
	Vehicle B	Count	322	202	290	814
		% within Label Type	35.4%	26.6%	27.5%	29.9%
	Both are equally good	Count	233	161	275	669
		% within Label Type	25.6%	21.2%	26.1%	24.6%
Total		Count	909	758	1053	2720
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The agencies identified the "correct " answer as A since both vehicles will operate in the mode using electricity, and the EREV is more fuel-efficient and less costly to operate in that range.

In this comparison, all three labels produced a large proportion of "incorrect" answers. Average "correct" response is 45.5%, with the proportion of "correct" responses across label designs varying from 39% to 52%.[7]

Understanding Q. 4: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	223	176	314	713
		% within Label Type	25.0%	23.2%	30.0%	26.4%
	Vehicle B	Count	470	457	570	1497
		% within Label Type	52.6%	60.3%	54.4%	55.5%
	Both are equally good	Count	200	125	164	489
		% within Label Type	22.4%	16.5%	15.6%	18.1%
Total		Count	893	758	1048	2699
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct" answer is B, based on a weighted average of fuel costs for the two modes that would be used over the distance. The PHEV's gasoline mode is sufficiently more efficient than that for the EREV to outweigh the higher efficiency of the EREV for the mode using electricity.

In this comparison, all three labels produced a majority of "correct " answers. Average "correct" response is 55.5%, with the proportion of "correct" responses across label designs varying from 53% to 60%.[8]

Pair #3
Key Metrics

- **Vehicle A: Extended-range electric (EREV):**

[7] Statistically significant: Cramer's V = .104, p = .000
[8] Statistically significant: Cramer's V = .062, p = .005

- All-electric: range 40 miles, 90 mpge, $672 annual fuel cost
- Extended range: 54 mpg, $778 annual fuel cost

- **Vehicle B: Electric, range 90 miles, 119 mpge, $508 annual fuel cost**

Understanding Q. 5: Which vehicle is better for a round-trip of 30 miles?

Q: Which vehicle is better for a round-trip of 30 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 30 miles?	Vehicle A	Count	190	125	206	521
		% within Label Type	20.9%	16.4%	19.8%	19.2%
	Vehicle B	Count	521	497	623	1641
		% within Label Type	57.4%	65.3%	59.8%	60.6%
	Both are equally good	Count	196	139	213	548
		% within Label Type	21.6%	18.3%	20.4%	20.2%
Total		Count	907	761	1042	2710
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct " answer is B, due to the greater efficiency and lower operating cost for the electric vehicle.

In this comparison, all three labels produced a solid majority of "correct " answers. Average "correct" response is 61%, with the proportion of "correct" responses across label designs varying from 57% to 65%.[9]

Understanding Q. 6: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	429	411	469	1309
		% within Label Type	48.2%	54.2%	45.1%	48.7%
	Vehicle B	Count	329	272	477	1078
		% within Label Type	37.0%	35.9%	45.9%	40.1%
	Both are equally good	Count	132	75	94	301
		% within Label Type	14.8%	9.9%	9.0%	11.2%
Total		Count	890	758	1040	2688
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct " answer is A, because the range for the electric vehicle is shorter than the trip length.

In this comparison, all three labels produced a large proportion of "incorrect " answers. Average "correct" response is 49%, with the proportion of "correct" responses across label designs varying from 45% to 54%.[10]

[9] Statistically significant: Cramer's V = .064, p = .004
[10] Statistically significant: Cramer's V = .074, p = .001

What parts of the label did respondents use?

Respondents were then asked what parts of the label they had used in making their choices. Based on the table below, the following three metrics were used most often:

- Fuel economy (especially on labels 3 and 2)
- Vehicle range (especially on labels 2 and 3)
- Gasoline and/or electricity consumption (similarly on all labels)

Q: What label information did you use in deciding which vehicle you would purchase in the previous questions? (Multiple responses allowed; Percents add up to more than 100%)

	Label Type 1		Label Type 2		Label Type 3	
	Count	%	Count	%	Count	%
Gasoline and/or electricity consumption	416	38.6%	338	38.7%	481	42.7%
Gasoline and/or electricity cost	220	20.4%	291	33.3%	307	27.2%
Environmental impact	88	8.2%	86	9.8%	144	12.8%
Vehicle range	464	43.0%	490	56.1%	651	57.8%
Rating information	172	16.0%	144	16.5%	176	15.6%
Fuel economy	553	53.1%	551	63.0%	769	68.2%

Regression results (presented in Appendix 2) provide these additional observations.

Explanatory variables that tended to *increase* the likelihood of identifying the "correct" answer include:

Fewer than 5 licensed drivers in the household
Being male
Not being the fastest adopter of new technology
More education
Having 5 or more household vehicles

These results, with the exception of "Male," are inconsistent across the regression results: that is, they are not statistically significantly different from zero for all the questions.

The classes of vehicles people considered buying appear to have some explanatory power as well. For instance, people who considered purchasing compact cars appear to have a higher likelihood of answering "correctly." These vehicle class variables may be serving as proxies for some personal characteristics not picked up in the other demographic variables.

Topline 'Selection' Question Results

To test whether the labels produced variation in people's *selections* of vehicle purchases, respondents saw pairs of labels for hypothetical vehicles (see Appendix 1, Selection Questions (SQ) 1-4). They were asked:

> Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern?

Because driving patterns of respondents were distributed randomly across the label designs, differences in responses across label designs are expected to be due to the label designs. In these questions there is no correct answer. Respondents identify their preferred vehicles based on their own decision factors.

In all four comparisons, the majority of respondents selected the vehicle with projected higher fuel cost savings or lower fuel costs. Those who saw either Label 1 or (in 2 of the 4 regressions) Label 3 chose the vehicle with lower projected fuel costs and higher fuel savings more often than those who saw Label 2.

Regression results in Appendix 2 show that, in 3 of the 4 comparisons, respondents who drove fewer miles per day had a greater tendency to select the vehicle with a lower-cost short range. This result suggests that people did think about daily driving patterns when making their choices.

Below we have presented the results from each label pair, preceded by a brief description of some of the key metrics shown on each label.

Pair #1

- **Vehicle A: Gasoline, 46 mpg, $913 annual fuel cost**
- **Vehicle B: Extended-range electric:**
  - **All-electric: range 20 miles, 98 mpge, $618 annual fuel cost**
  - **Extended range: 28 mpg, $1,500 annual fuel cost**

Selection Q. 1:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	631	434	637	1702
		% within Label Type	69.8%	57.9%	61.8%	63.4%
	Vehicle B	Count	157	224	258	639
		% within Label Type	17.4%	29.9%	25.0%	23.8%
	Equally likely to purchase either vehicle	Count	116	91	135	342
		% within Label Type	12.8%	12.1%	13.1%	12.7%
Total		Count	904	749	1030	2683
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, regardless of label design, most respondents chose the conventional gasoline engine vehicle. Average proportion choosing the gasoline vehicle is 63%, with the proportion choosing the gasoline vehicle across label designs varying from 58% to 70%.[11]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the gasoline vehicle:

A larger share of highway driving

Being slow to adopt new technologies

Pair #2

- **Vehicle A: Gasoline, 28 mpg, $1,500 annual fuel cost**
- **Vehicle B: Electric, range 85 miles, 123 mpge, $490 annual fuel cost**

Selection Q. 2:

Q Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	229	234	267	730
		% within Label Type	25.3%	31.4%	25.9%	27.2%
	Vehicle B	Count	612	446	690	1748
		% within Label Type	67.7%	59.8%	67.0%	65.2%
	Equally likely to purchase either vehicle	Count	63	66	73	202
		% within Label Type	7.0%	8.8%	7.1%	7.5%
Total		Count	904	746	1030	2680
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, regardless of label design, most respondents chose the electric vehicle. Average proportion choosing the electric vehicle is 65%, with the proportion choosing the electric vehicle across label designs varying from 60% to 68%.[12]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the electric vehicle:

Being under age 65

Driving less than 70 miles on a daily basis

Ranking the fuel economy label very highly in the decision process

Pair #3

- **Vehicle A: Extended-range electric (EREV):**
  - **All-electric: range 32 miles, 89 mpge, $679 annual fuel cost**
  - **Extended range: 31 mpg, $1,355 annual fuel cost**
- **Vehicle B: Electric, range 80 miles, 121 mpge, $501 annual fuel cost**

[11] Statistically significant: Cramer's V = .084, p = .000

[12] Statistically significant: Cramer's V = .050, p = .009

Selection Q. 3:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	353	334	359	1046
		% within Label Type	39.0%	45.0%	35.0%	39.1%
	Vehicle B	Count	475	324	548	1347
		% within Label Type	52.5%	43.7%	53.4%	50.4%
	Equally likely to purchase either vehicle	Count	77	84	120	281
		% within Label Type	8.5%	11.3%	11.7%	10.5%
Total		Count	905	742	1027	2674
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, there is more of an even split between the two vehicle types, with half overall choosing the Electric Vehicle (50%) and another 11% indicating that they would be equally likely to purchase either vehicle. Average proportion choosing the electric vehicle is 50%, with the proportion choosing the electric vehicle across label designs varying from 44% to 53%.[13]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the electric vehicle:

Having 1 vehicle in their household

Driving less than 70 miles on a typical day

<u>Pair #4</u>

- **Vehicle A: Extended-range electric:**
  - **All-electric: range 30 miles, 90 mpge, $672 annual fuel cost**
  - **Extended range: 32 mpg, $1,313 annual fuel cost**
- **Vehicle B: Plug-in hybrid electric:**
  - **Blended: range 30 miles, 65 mpge, $734 annual fuel cost**
  - **Extended range: 54 mpg, $778 annual fuel cost**

Selection Q. 4:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your ther requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	210	164	262	636
		% within Label Type	23.3%	22.0%	25.4%	23.7%
	Vehicle B	Count	532	450	593	1575
		% within Label Type	59.0%	60.5%	57.5%	58.8%
	Equally likely to purchase either vehicle	Count	160	130	177	467
		% within Label Type	17.7%	17.5%	17.2%	17.4%
Total		Count	902	744	1032	2678
		% within Label Type	100.0%	100.0%	100.0%	100.0%

[13] Statistically significant: Cramer's V = .069, p = .000

In this comparison, regardless of label design, most respondents chose the Plug-in Hybrid Electric Vehicle (PHEV). Average proportion choosing the PHEV is 59%, with the proportion choosing the PHEV across label designs varying from 58% to 61%.[14]

Regression results for this comparison (see Appendix 2) suggest the following factor tends to increase the likelihood of choosing the PHEV:

Higher proportion of highway miles

What parts of the label did respondents use?

Respondents were then asked what parts of the label they had used in making their purchase selections. Based on the table below, the following four metrics were used most often:

- Fuel economy (especially on labels 3 and 2)
- Vehicle range (especially on labels 2 and 3)
- Gasoline and/or electricity cost (especially for label 3 and 2)
- Gasoline and/or electricity consumption (especially for label 3)

Q: What label information did you use in deciding which vehicle you would purchase in the previous questions? (Multiple responses allowed; Percents add up to more than 100%)

	Label Type 1		Label Type 2		Label Type 3	
	Count	%	Count	%	Count	%
Gasoline and/or electricity consumption	418	38.8%	359	41.1%	539	47.8%
Gasoline and/or electricity cost	362	33.6%	411	47.0%	552	49.0%
Environmental impact	113	10.5%	131	15.0%	238	21.1%
Vehicle range	439	40.7%	460	52.6%	594	52.7%
Rating information	210	19.5%	202	23.1%	278	24.7%
Fuel economy	571	53.0%	563	64.4%	742	65.8%

[14] Statistically not significant: Cramer's V = .023, p = .569

Appendix 1

Labels Used in the Surveys

UQ1 & UQ2:

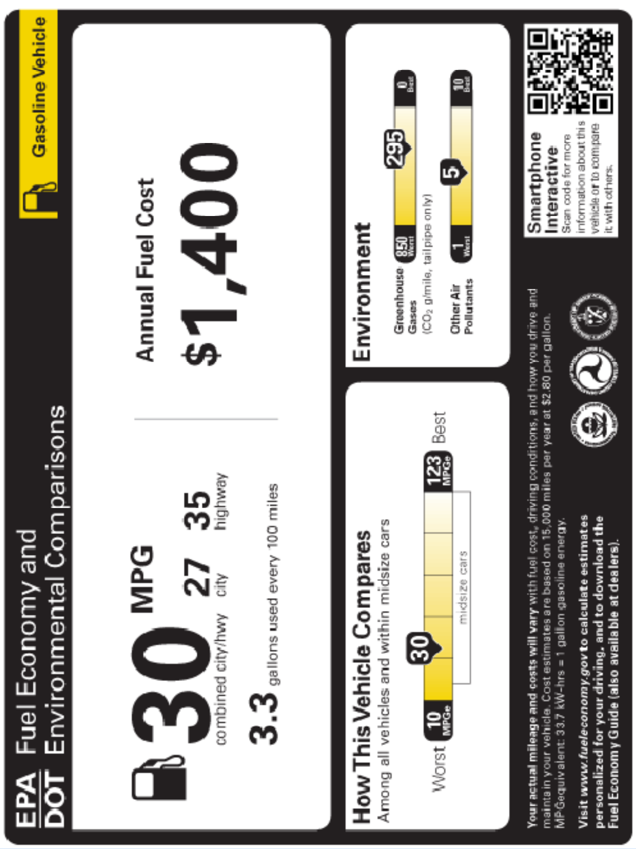
Label Type 1

Vehicle A:

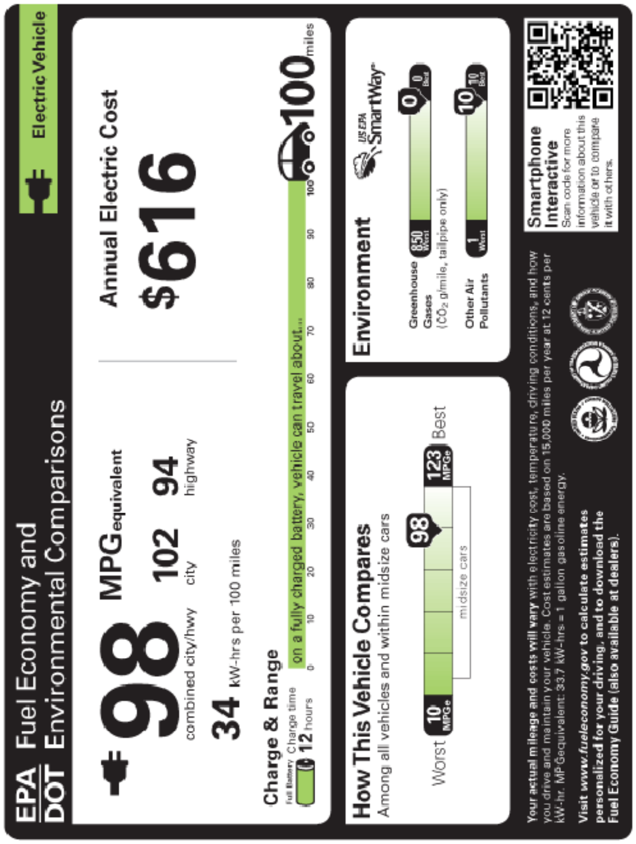
Vehicle B:

Label Type 2

Vehicle A:

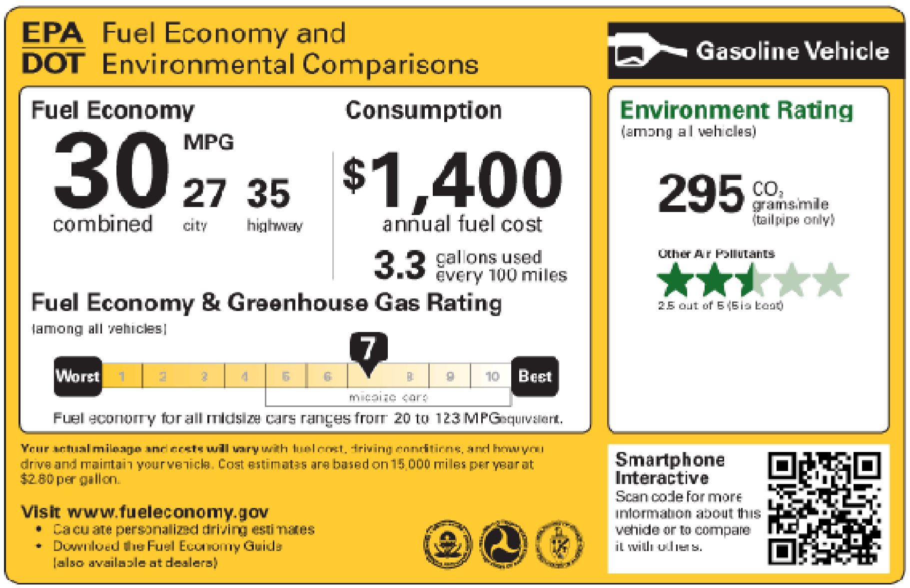


Vehicle B:

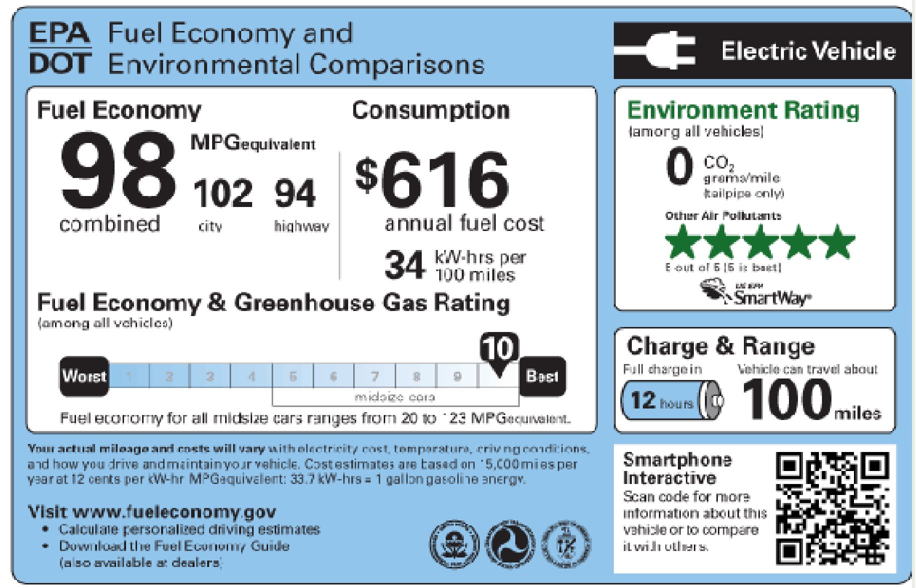


Label Type 3

Vehicle A:



Vehicle B:



UQ3 & UQ4:

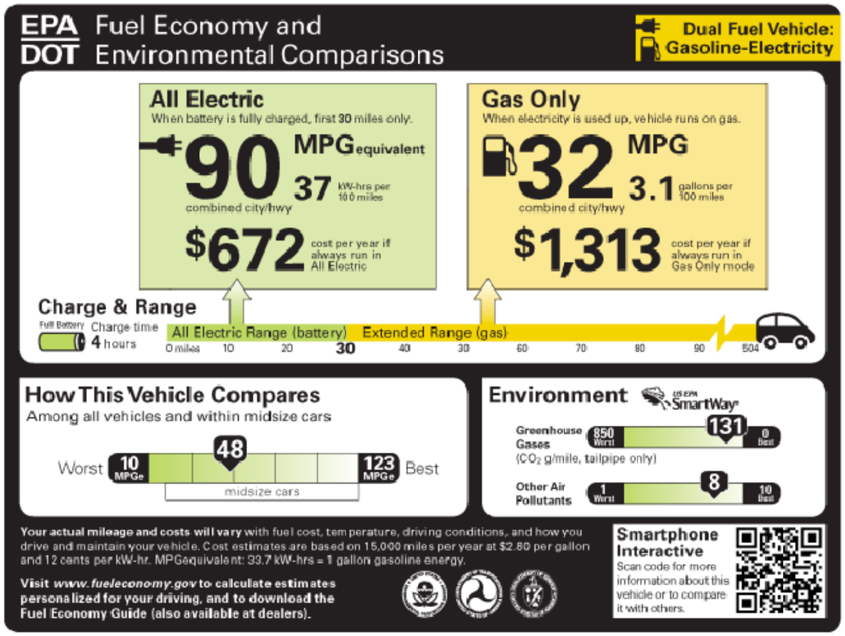
Label Type 1

Vehicle A:

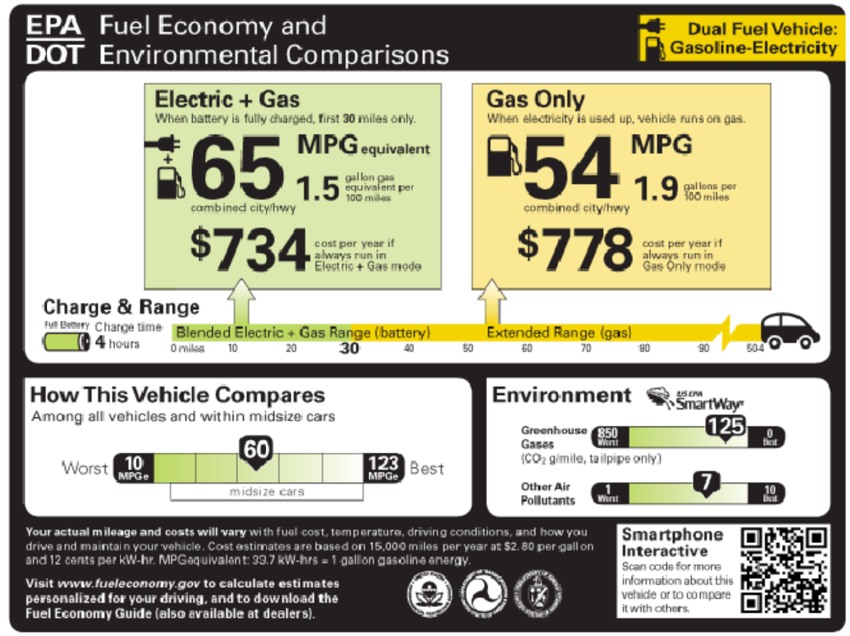
Vehicle B:

Label Type 2

Vehicle A:

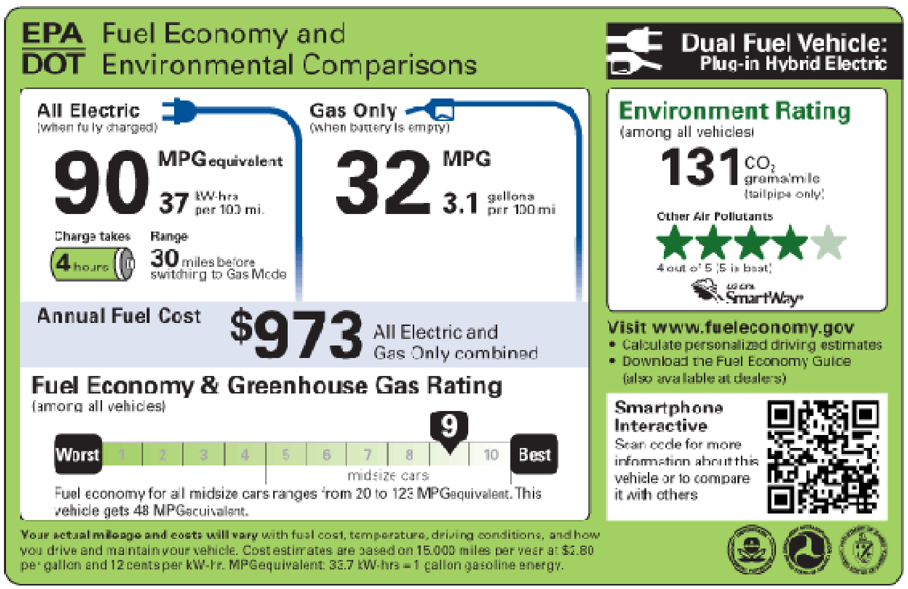


Vehicle B:

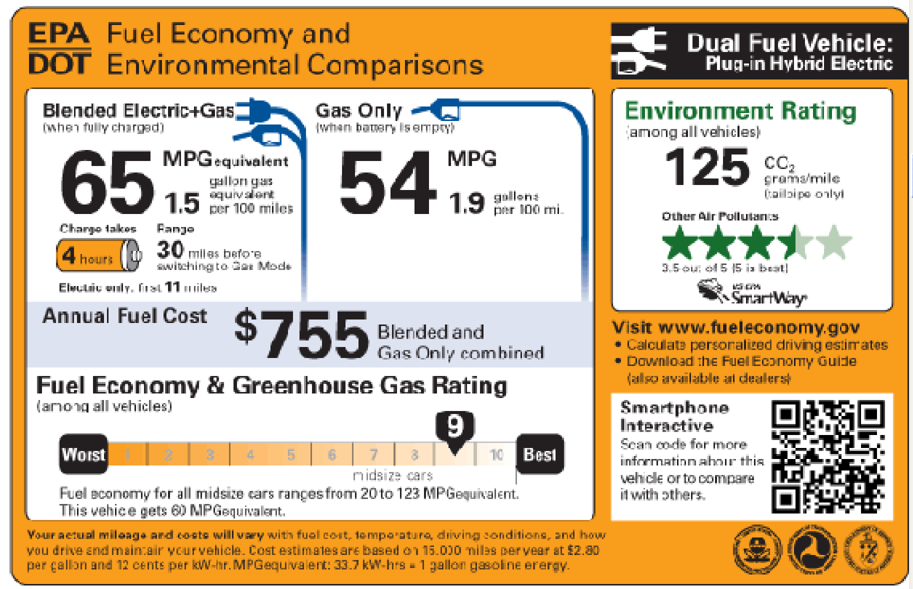


Label Type 3

Vehicle A:



Vehicle B:



UQ5 & UQ6:

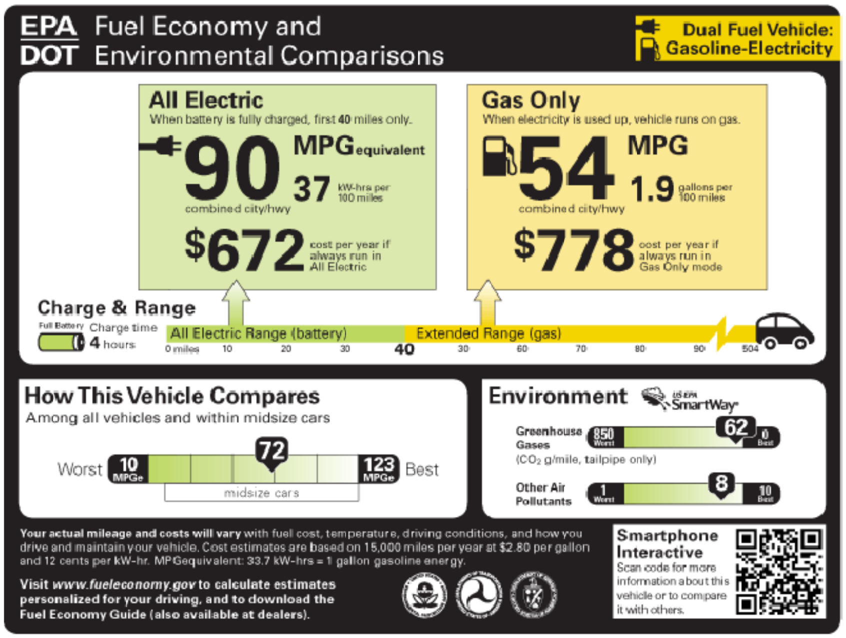
Label Type 1

Vehicle A:

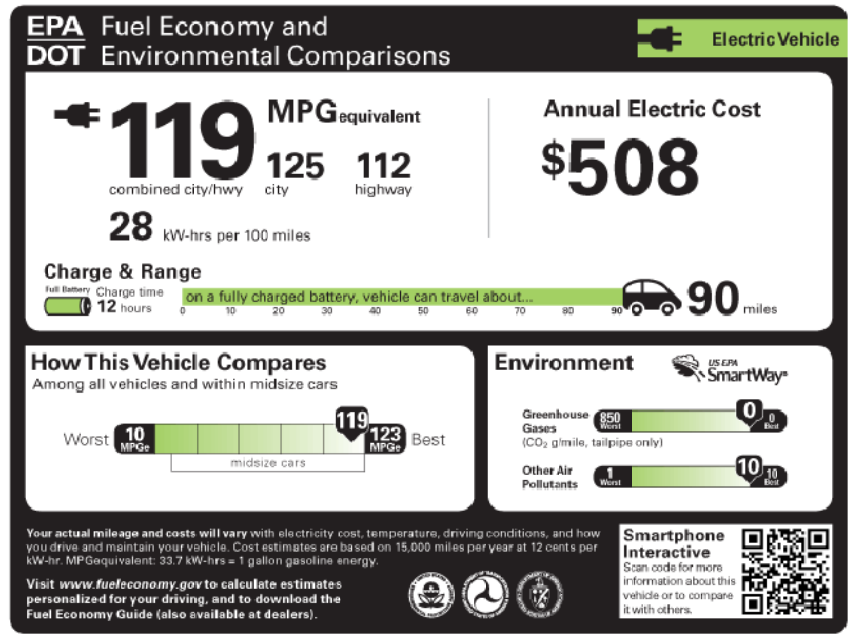
Vehicle B:

Label Type 2

Vehicle A:

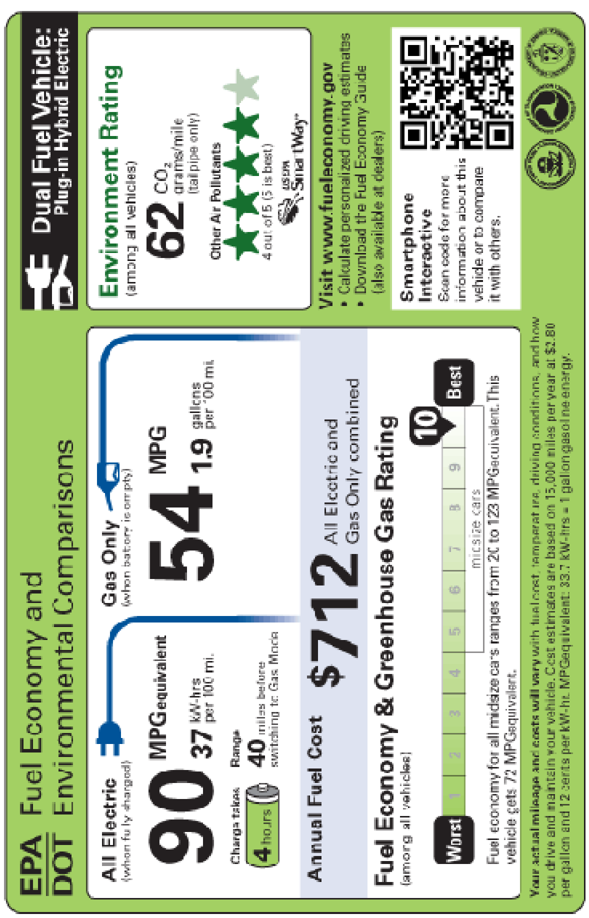


Vehicle B:

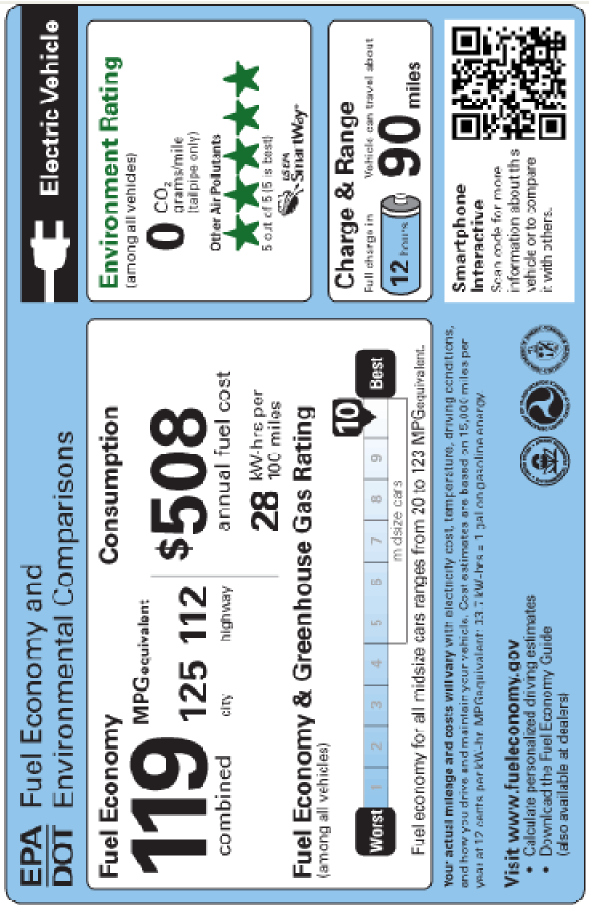


Label Type 3

Vehicle A:



Vehicle B:



SQ1:

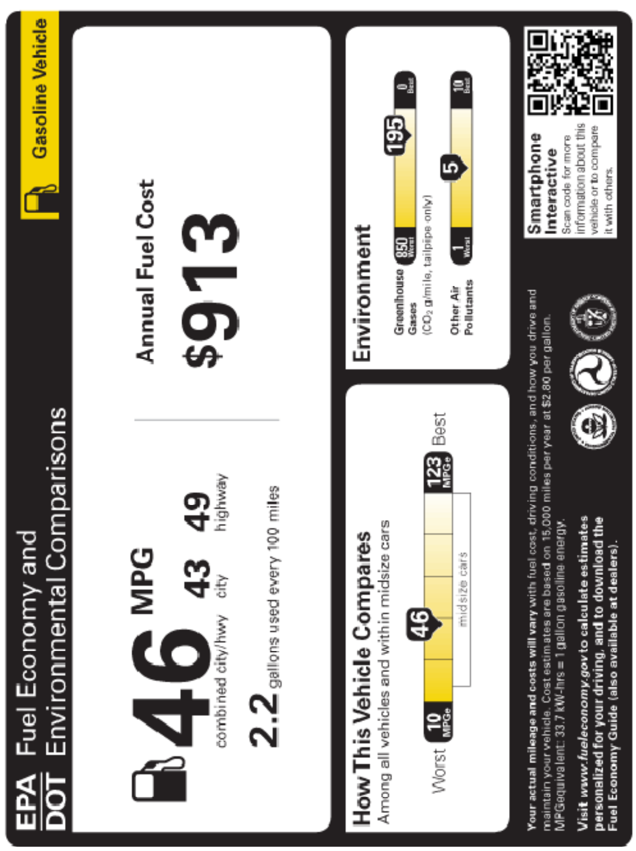
Label Type 1

Vehicle A:

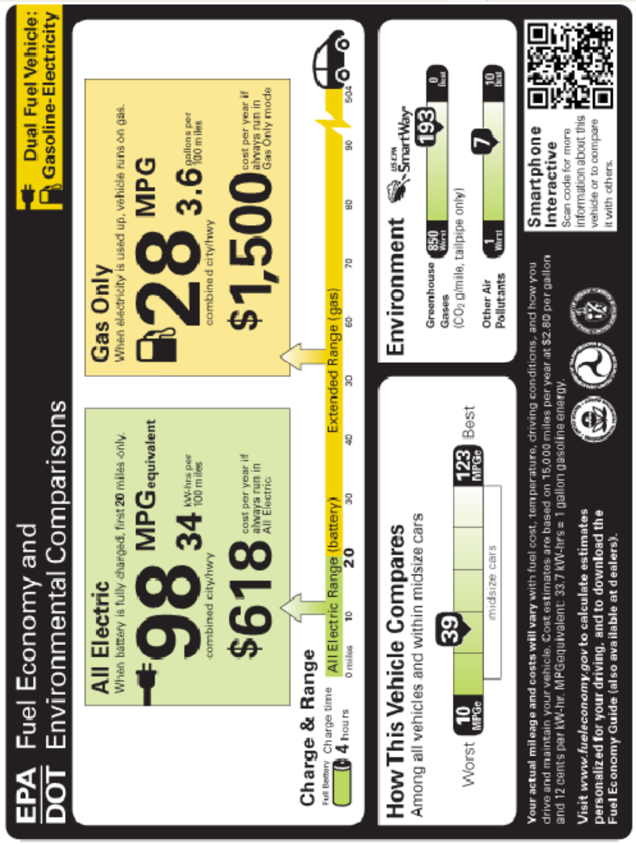
Vehicle B:

Label Type 2

Vehicle A:

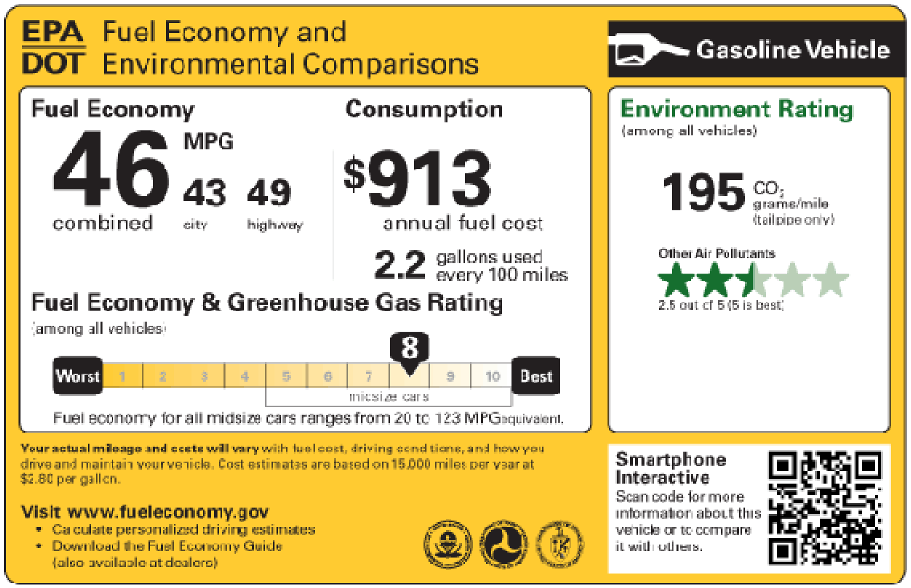


Vehicle B:

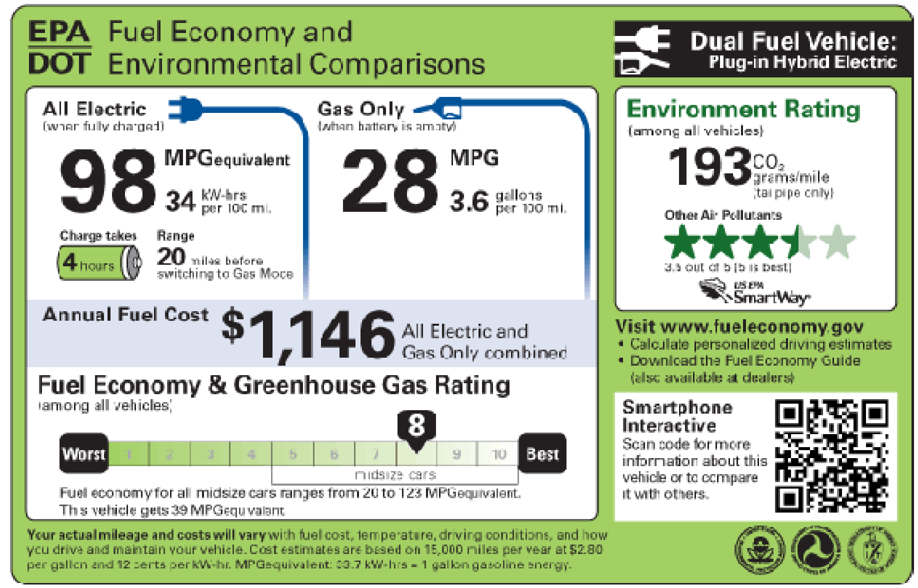


Label Type 3

Vehicle A:



Vehicle B:



SQ2:

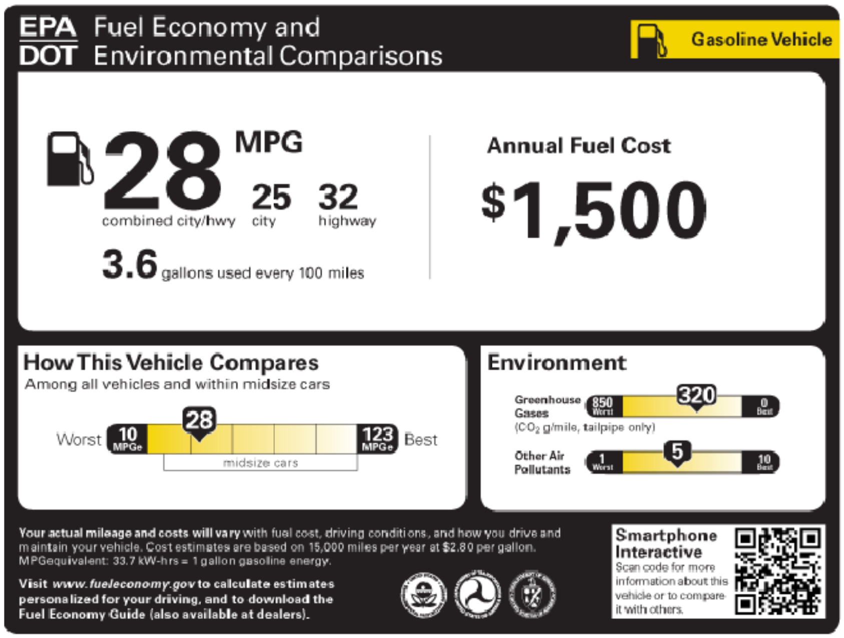
Label Type 1

Vehicle A:

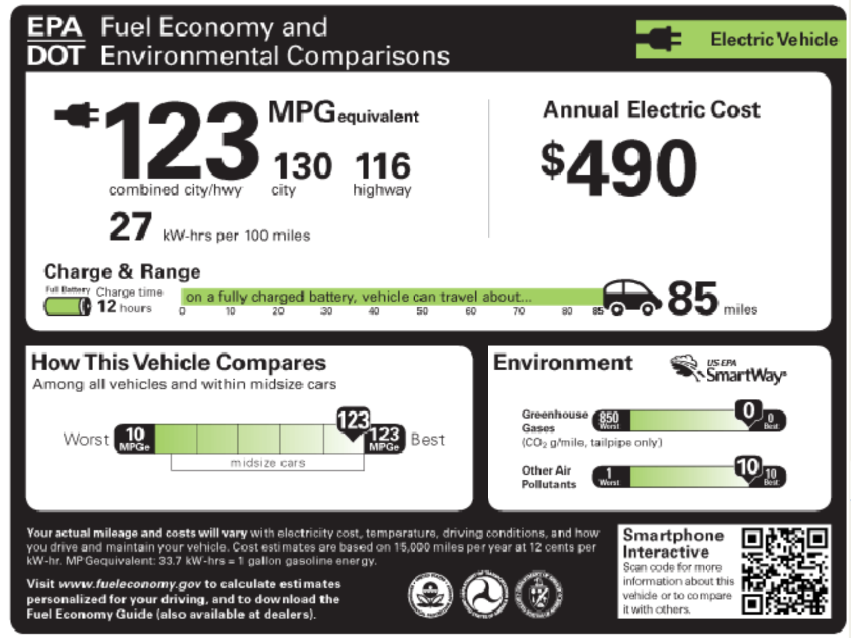
Vehicle B:

Label Type 2

Vehicle A:

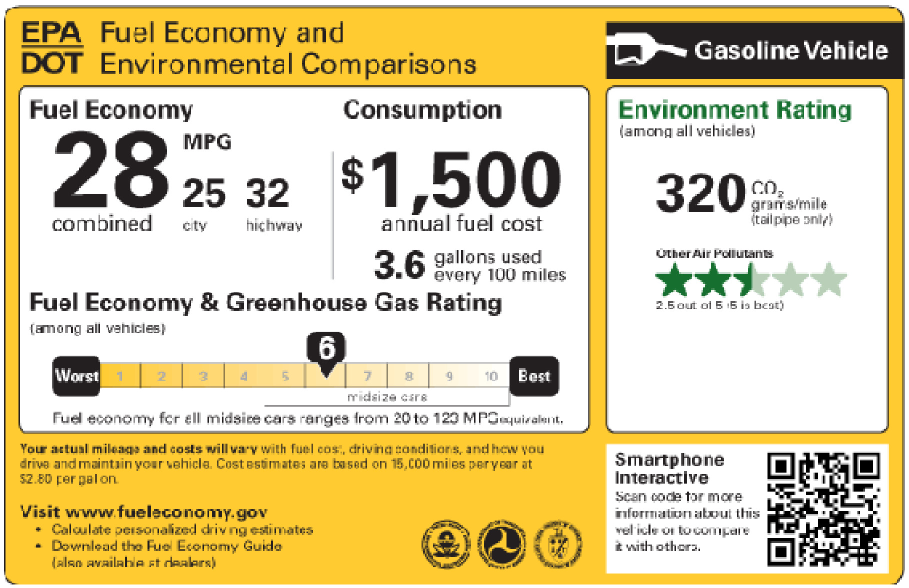


Vehicle B:

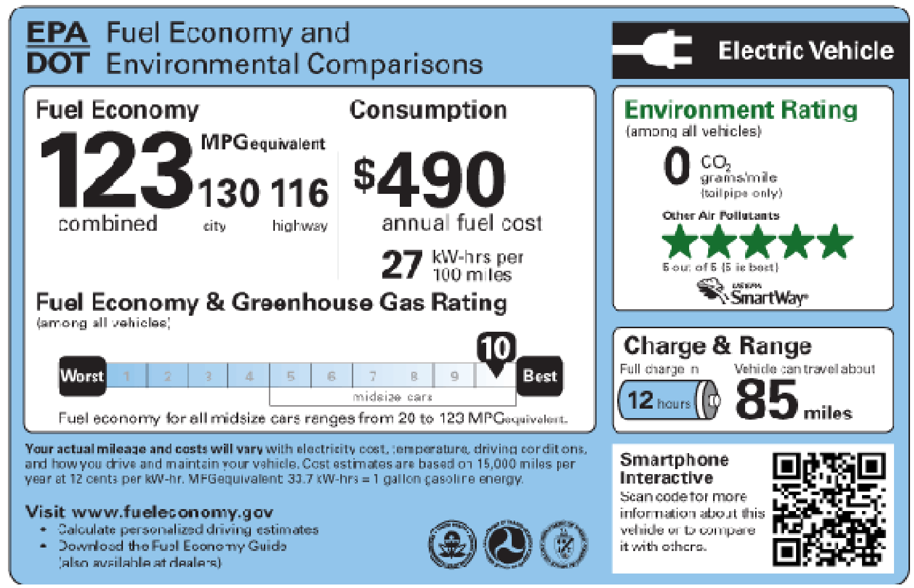


Label Type 3

Vehicle A:



Vehicle B:



SQ3:

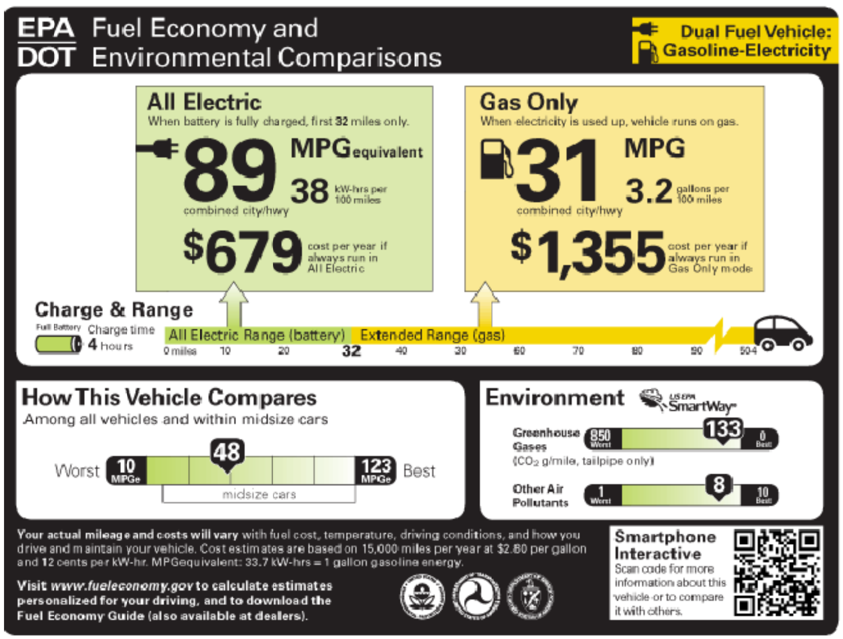
Label Type 1

Vehicle A:

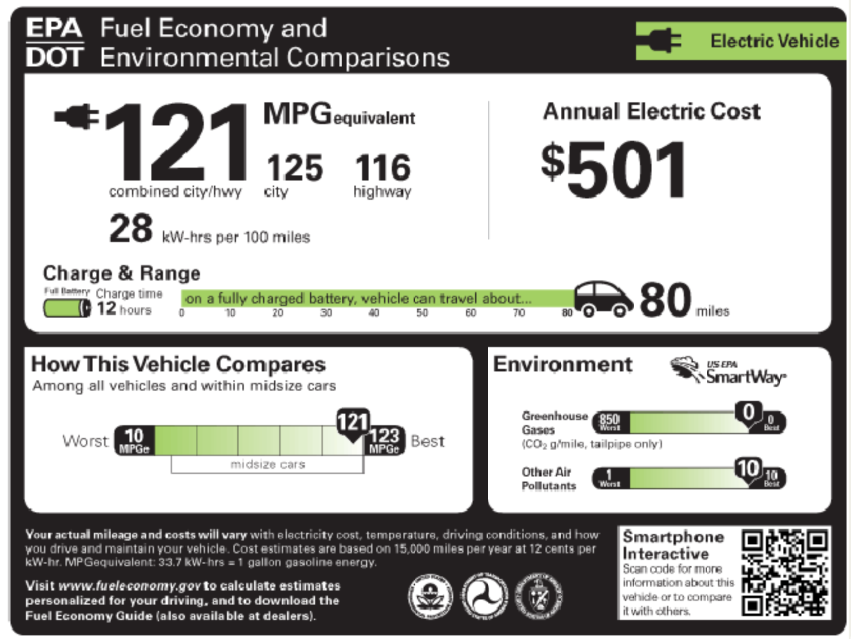
Vehicle B:

Label Type 2

Vehicle A:

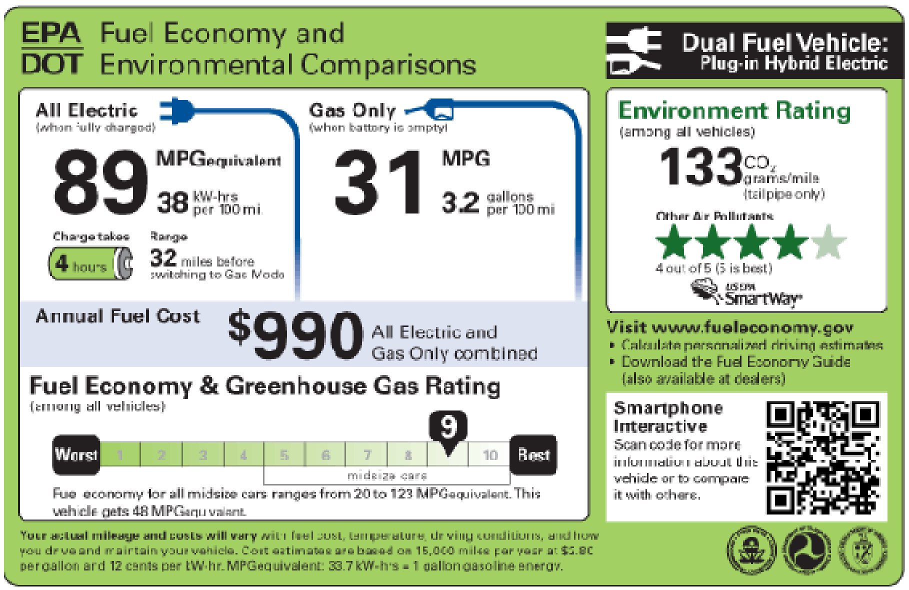


Vehicle B:

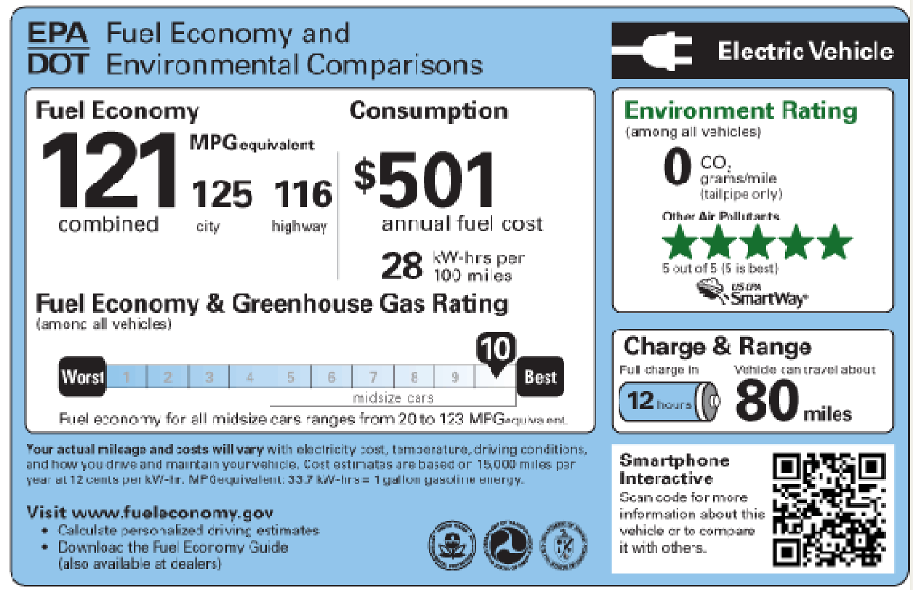


Label Type 3

Vehicle A:



Vehicle B:



SQ4:

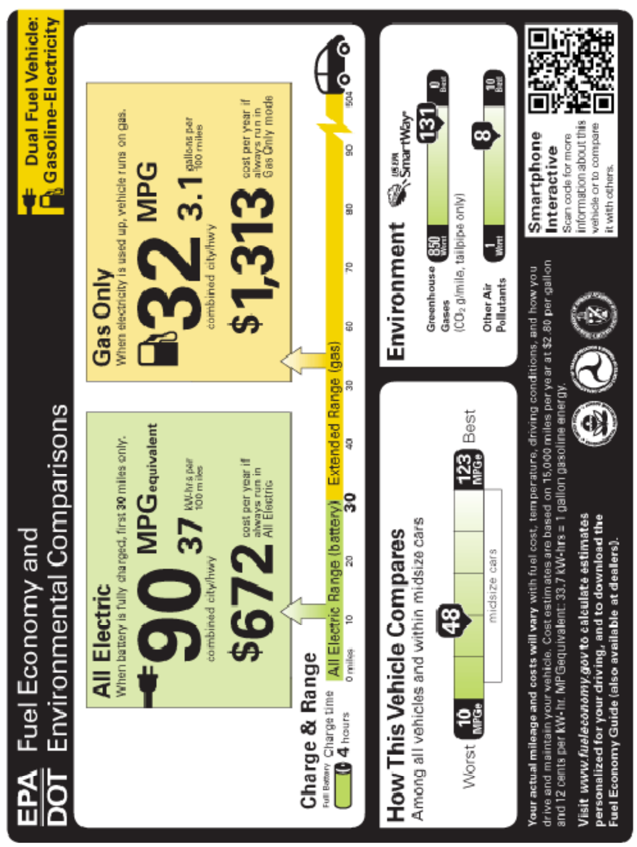
Label Type 1

Vehicle A:

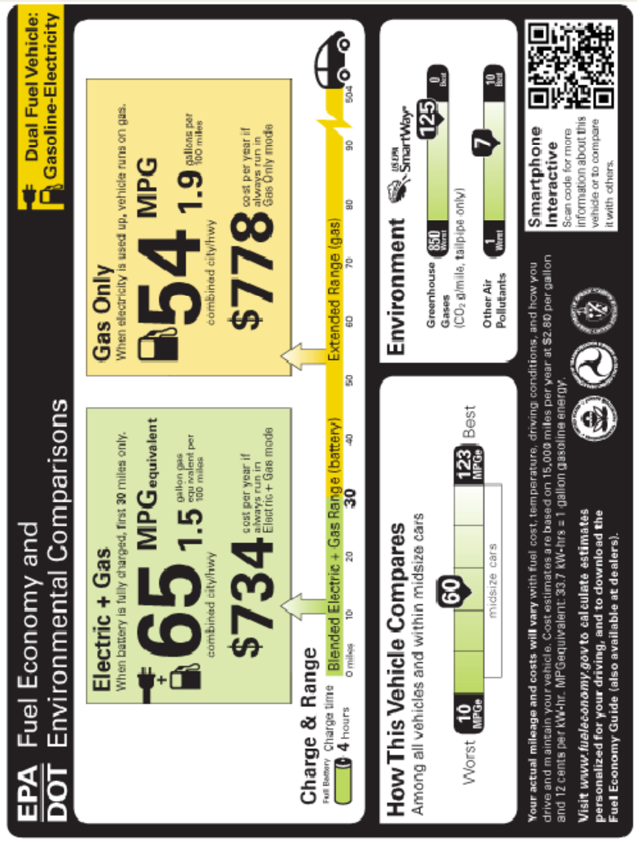
Vehicle B:

Label Type 2

Vehicle A:

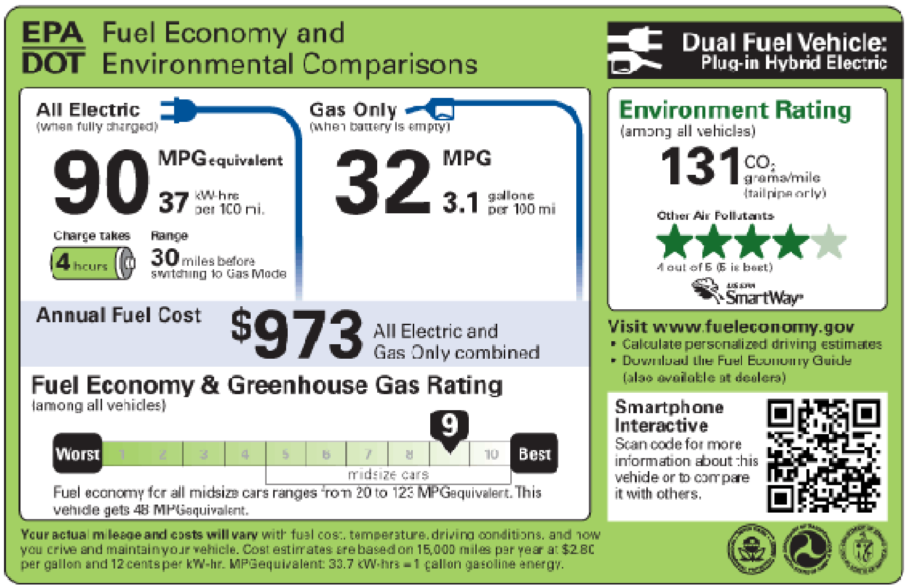


Vehicle B:

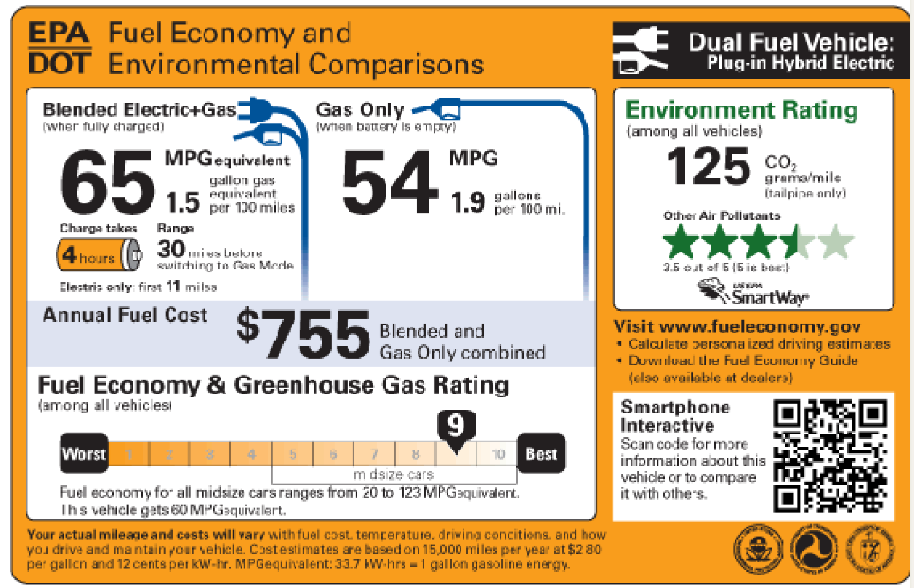


Label Type 3

Vehicle A:



Vehicle B:



Appendix 2

Regression Results

Fuel Economy Label Survey Choice Models

Technical Memorandum
Label Understanding and Vehicle Selection Models

Interpretation of the Coefficients and Odds Ratios from Logistic Regressions

This technical memorandum presents the preliminary results of the modeling for the EPA/NHTSA Fuel Economy Label Design survey. From the Fuel Economy Label survey data, the presented results are from the discrete choice modeling of the following:

1. Respondent label understanding responses (Understanding Questions 1-6)
2. Respondent vehicle preference/likely to purchase (Selection Questions 1-4)

Logit (choice) models are estimated with the binary (e.g., 0 or 1) choice variable (the answer to either the understanding or vehicle choice questions) on the left-hand side of the model. The label design indicator variables and a series of demographic and other respondent survey responses are on the right-hand side (RHS), as either the control or predictor variables.

The logit model is the appropriate model when the variable of interest is a binary variable (e.g., the variable takes on values of 0 or 1). The logit model predicts the probability of the dependent variable taking on a value equal to 1, given the predictor and control variables of the model.

The probability of the outcome, and the odds ratio of the outcome are key concepts for correctly interpreting the results from these models.

For the *label understanding* choice models:

- Probability is defined as the probability that the respondent selects the correct answer. E.g., p is the probability that the respondent answers correctly, or p(correct=1)
- The 'odds' of a correct answer is the ratio of the probability of a correct answer (p), over the probability of the incorrect answer (1-p), or: p/(1-p).
- And the log odds ratio, or "logit" is then: LN(p/(1-p))
- The "Both are equally good" responses to Understanding Questions 1-6 were categorized as "incorrect" for the label understanding modeling.

For the *vehicle likely to purchase (selection)* choice models:

- Probability is defined as the probability that the respondent selects the first vehicle (i.e., Vehicle A). To interpret the results from the vehicle preference models, it is important to consider the model results with respect to the two vehicles being compared and the vehicle that corresponds to Vehicle A (e.g., p(vehicle A=1)).
- The "Equally likely to purchase either vehicle" responses were randomly assigned to Vehicle A or Vehicle B, using a uniform distribution.

Simple Numerical Example of an Odds Ratio

Prior to Understanding Questions 1 and 2 in the survey, respondents are shown fuel economy labels for a gasoline vehicle and a dual fuel electric vehicle. Understanding

Question 1 then asks respondents which vehicle is better for a 30-mile round-trip (*the correct answer is the dual fuel electric*).

The frequency tabulation for the answers to Understanding Question 1 is shown in Table 1.

Table 1 'Correct' and 'Incorrect' Frequency Tabulation for Understanding Question 1

Understanding Question 1	Frequency
Correct	2,097
Incorrect	608
Total	2,705

From this frequency tabulation of the answers to Understanding Question 1, we can calculate the following:

- The probability of the respondent selecting the correct answer is:
  p = prob(correct=1)= 2097/2705 = 0.775
- The odds of a correct answer are: 0.775/(1-0.775) = 3.449
- The log odds is: log(3.45) = 1.238

The calculated log odds is the same as the estimated coefficient on the constant term in a model without any other predictor variables:

Table 2 Logistic Regression Results for Understanding Question 1, Constant Term Only

```
Logistic regression                    Number of obs    =    2705
------------------------------------------------------------------------------
  Question 1 |     Coef.    Std. Err.     z     P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    Constant |  1.238088   .0460609   26.88   0.000     1.14781    1.328366
------------------------------------------------------------------------------
```

This simple numerical example of the calculation of the odds ratio and the presentation of the logistic regression results for a model with only a constant term are intended to illustrate the basic interpretation of the odds ratio.[1] As predictor variables are introduced to the model, the interpretation of the coefficients and odds ratio does not change in any fundamental way.

[1] This exposition is based on the explanation provided at: UCLA, Academic Technology Services, Statistical Consulting Group. *FAQ: How do I interpret odds ratios in logistic regression?* http://www.ats.ucla.edu/stat/mult_pkg/faq/general/odds_ratio.htm (accessed October 9, 2010).

Notably, we can make the following statements about the correct interpretation of the logistic regression results:

- The estimated coefficients from the models represent the rate of change in the log odds ratio for the change in the predictor (RHS) variable.
- These changes are interpreted relative to the default case for dichotomous RHS variables; and are interpreted for a one-unit change in the RHS variable in the case of continuous RHS variables.
- From the above example, we can see that the odds ratio is an easy mathematical transformation and more intuitive way to interpret the model results.
- For a given right-hand side variable, the odds ratio is the estimated effect on the odds ratio for the event for that predictor variable. Based on this explanation, we can make the following interpretations and conclusions about the coefficients and odds ratios:
  - An odds ratio of 1.5 is interpreted as the predictor variable being associated with the odds of a correct answer being 1 and 1/2 times more likely than the odds of the incorrect answer.
  - Negative coefficients from the model produce odds ratios of less than one, so a change in the right-hand side variable makes the outcome <u>less</u> likely to occur.

Again, the coefficients from the logistic regression for dichotomous right-hand side variables are always interpreted relative to the default case. For example, if the coefficient on Male (gender) is 0.391 then using the odds ratio transformation of the coefficient, the odds ratio is 1.478. This indicates that the odds for a correct answer are 147.8 percent for males than the odds for females.

For a continuous right-hand side variable, the coefficient represented as the odds ratio is the effect of a 1-unit change in the variable on the *difference* in log odds. For example: for a one-unit increase in the share of miles in the city, we see a 100.7 percent increase in the odds of selecting the correct answer in the understanding choice models (or, of selecting vehicle A, in the case of the selection models). (Note than interpretation of negative odds ratios are conceptually slightly more complex.)

Thus, each exponentiated coefficient is either the ratio of two odds (e.g., for dichotomous RHS variables); or the change in odds (continuous) for a unit increase in the corresponding RHS variable holding other variables at constant value(s).

The following pages present the model estimation results for the choice models. The results contain both the estimated coefficient and the odds ratio. The z-statistic is displayed in parentheses underneath the estimated coefficient. The z-statistic indicates whether the estimated coefficient is statistically different from zero.

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	-0.048 (0.060)	0.953	0.247 (0.340)	1.280
Label 1 Dummy Variable	-0.709 (5.65)**	0.492	0.183 (1.770)	1.201
Label 2 Dummy Variable	-0.311 (2.30)*	0.733	0.316 (2.91)**	1.372
City Miles Share of Miles (e.g., 1-100)	-0.002 (0.630)	0.998	-0.004 (1.830)	0.996
Age 18-24	-0.258 (0.690)	0.773	-0.610 (1.880)	0.543
Age 25-34	-0.189 (0.730)	0.828	-0.238 (1.150)	0.788
Age 35-44	-0.237 (0.910)	0.789	-0.090 (0.440)	0.914
Age 45-54	-0.369 (1.500)	0.691	0.218 (1.110)	1.244
Age 55-64	0.103 (0.420)	1.108	0.049 (0.260)	1.050
Less than High School	-0.822 (1.030)	0.440	-1.016 (1.320)	0.362
High School	-0.490 (2.30)*	0.613	-0.653 (3.51)**	0.520
Some College	-0.339 (2.23)*	0.712	-0.219 (1.780)	0.803
College	-0.236 (1.690)	0.790	0.029 (0.260)	1.029
Household Income Less Than $15k	0.150 (0.300)	1.162	-0.316 (0.680)	0.729
Household Income $15-$25k	-0.714 (1.610)	0.490	-0.634 (1.370)	0.530
Household Income $25-$50k	0.010 (0.040)	1.010	0.042 (0.210)	1.043
Household Income $50-$75k	0.345 (1.770)	1.412	0.142 (0.890)	1.153
Household Income $75-$100k	0.179 (1.090)	1.196	0.255 (1.840)	1.290
Household Income $100-$125k	0.356 (2.12)*	1.428	0.066 (0.480)	1.068
Household Income $125-$150k	0.393 (2.04)*	1.481	0.195 (1.250)	1.215
Household Size=1	0.677 (1.000)	1.968	-0.458 (0.780)	0.633
Household Size=2	-0.045 (0.090)	0.956	-0.357 (0.770)	0.700
Household Size=3	0.341 (0.720)	1.406	-0.155 (0.340)	0.856
Household Size=4	0.279 (0.590)	1.322	-0.342 (0.750)	0.710
Household Size=5	0.356 (0.740)	1.428	-0.306 (0.660)	0.736
Household Size=6	0.967 (1.650)	2.630	-0.410 (0.790)	0.664

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.614 (1.270)	0.541	-0.279 (0.700)	0.757
Household Vehicles=2	-0.144 (0.540)	0.866	-0.507 (2.23)*	0.602
Household Vehicles=3	-0.126 (0.480)	0.882	-0.457 (2.05)*	0.633
Household Vehicles=4	-0.233 (0.840)	0.792	-0.397 (1.630)	0.672
Licensed Drivers in Household=1	1.512 (2.32)*	4.536	1.423 (2.64)**	4.150
Licensed Drivers in Household=2	1.033 (2.57)*	2.809	1.160 (3.10)**	3.190
Licensed Drivers in Household=3	0.957 (2.43)*	2.604	1.239 (3.36)**	3.452
Licensed Drivers in Household=4	0.828 (2.07)*	2.289	1.209 (3.21)**	3.350
Male	0.446 (3.89)**	1.562	0.393 (4.24)**	1.481
Daily Miles Driven, Less than 20	0.187 (0.520)	1.206	-0.264 (0.860)	0.768
Daily Miles Driven, 20-30	0.123 (0.340)	1.131	-0.293 (0.950)	0.746
Daily Miles Driven, 31-40	0.099 (0.270)	1.104	-0.490 (1.570)	0.613
Daily Miles Driven, 41-50	0.216 (0.570)	1.241	-0.092 (0.280)	0.912
Daily Miles Driven, 51-60	0.378 (0.960)	1.459	-0.278 (0.850)	0.757
Daily Miles Driven, 61-70	-0.244 (0.590)	0.783	-0.637 (1.760)	0.529
Daily Miles Driven, 71-80	0.297 (0.640)	1.346	-0.630 (1.660)	0.533
Daily Miles Driven, 81-90	-1.001 (2.10)*	0.368	-0.420 (0.960)	0.657
Daily Miles Driven, 91-100	0.294 (0.590)	1.342	-0.173 (0.430)	0.841
Importance of Fuel Economy rated 2 (7 =very important)	0.425 (0.830)	1.530	-0.268 (0.580)	0.765
Importance of Fuel Economy rated 3 (7 =very important)	0.066 (0.140)	1.068	-0.730 (1.680)	0.482
Importance of Fuel Economy rated 4 (7 =very important)	0.445 (0.980)	1.560	-0.574 (1.400)	0.563
Importance of Fuel Economy rated 5 (7 =very important)	0.488 (1.070)	1.629	-0.426 (1.040)	0.653
Importance of Fuel Economy rated 6 (7 =very important)	0.509 (1.100)	1.664	-0.644 (1.540)	0.525
Importance of Fuel Economy rated 7 (7 =very important)	0.233 (0.490)	1.262	-0.848 (1.98)*	0.428

EPA Fuel Economy Label Choice Models

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.144 (0.410)	1.155	0.213 (0.730)	1.237
Importance of Fuel Economy Label=3	-0.072 (0.220)	0.931	0.142 (0.520)	1.153
Importance of Fuel Economy Label=4	-0.232 (0.760)	0.793	-0.055 (0.210)	0.946
Importance of Fuel Economy Label=5	-0.020 (0.060)	0.980	0.045 (0.170)	1.046
Importance of Fuel Economy Label=6	0.209 (0.650)	1.232	0.124 (0.460)	1.132
Importance of Fuel Economy Label=7	0.277 (0.810)	1.319	-0.047 (0.170)	0.954
Vehicles considered=Sports Car	-0.066 (0.400)	0.936	-0.321 (2.29)*	0.725
Vehicles considered=Subcompact Car	-0.052 (0.220)	0.949	0.423 (2.24)*	1.527
Vehicles considered=Compact Car	0.330 (2.13)*	1.391	0.271 (2.20)*	1.311
Vehicles considered=Midsized Car	0.161 (1.400)	1.175	0.093 (1.000)	1.097
Vehicles considered=Large Car	-0.010 (0.060)	0.990	0.162 (1.080)	1.176
Vehicles considered=Station Wagon	-0.385 (1.600)	0.680	-0.274 (1.310)	0.760
Vehicles considered=SUV	0.108 (0.930)	1.114	-0.078 (0.810)	0.925
Vehicles considered=Crossover	0.038 (0.300)	1.039	0.417 (3.99)**	1.517
Vehicles considered=Pickup Truck	0.004 (0.020)	1.004	-0.063 (0.440)	0.939
Vehicles considered=Mini-Van	0.157 (0.800)	1.170	0.187 (1.170)	1.206
Vehicles considered=Van	-1.067 (2.39)*	0.344	-0.820 (1.890)	0.440
Vehicles considered=Other	0.707 (1.750)	2.028	0.841 (2.86)**	2.319
Early Adopter=2 (1 is first to adopt)	0.077 (0.310)	1.080	-0.274 (1.310)	0.760
Early Adopter=3 (1 is first to adopt)	0.260 (1.080)	1.297	0.073 (0.370)	1.076
Early Adopter=4 (1 is first to adopt)	-0.062 (0.270)	0.940	0.120 (0.610)	1.127
Early Adopter=5 (1 is first to adopt)	-0.035 (0.150)	0.966	-0.012 (0.060)	0.988
Early Adopter=6 (1 is first to adopt)	0.007 (0.030)	1.007	0.020 (0.090)	1.020
Early Adopter=7 (1 is first to adopt)	-0.585 (1.820)	0.557	-0.306 (1.040)	0.736
Observations	2358		2382	

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
+ significant at 10%; ** significant at 5%; * significant at 1%

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	-0.840 (1.210)	0.432	-1.132 (1.620)	0.322
Label 1 Dummy Variable	-0.326 (3.21)**	0.722	-0.050 (0.500)	0.951
Label 2 Dummy Variable	0.256 (2.42)*	1.292	0.273 (2.53)*	1.314
City Miles Share of Miles (e.g., 1-100)	0.001 (0.350)	1.001	-0.001 (0.610)	0.999
Age 18-24	0.032 (0.100)	1.033	0.421 (1.340)	1.523
Age 25-34	0.205 (1.000)	1.228	0.325 (1.570)	1.384
Age 35-44	0.004 (0.020)	1.004	0.114 (0.550)	1.121
Age 45-54	0.004 (0.020)	1.004	0.139 (0.710)	1.149
Age 55-64	0.077 (0.410)	1.080	0.369 (1.950)	1.446
Less than High School	-0.110 (0.140)	0.896	-0.526 (0.690)	0.591
High School	-0.190 (1.050)	0.827	0.143 (0.790)	1.154
Some College	-0.112 (0.920)	0.894	0.097 (0.790)	1.102
College	-0.060 (0.550)	0.942	0.031 (0.280)	1.031
Household Income Less Than $15k	0.191 (0.450)	1.210	-0.404 (0.900)	0.668
Household Income $15-$25k	-1.310 (2.68)**	0.270	-0.088 (0.210)	0.916
Household Income $25-$50k	-0.163 (0.810)	0.850	-0.023 (0.110)	0.977
Household Income $50-$75k	0.044 (0.280)	1.045	-0.021 (0.130)	0.979
Household Income $75-$100k	-0.074 (0.550)	0.929	0.032 (0.230)	1.033
Household Income $100-$125k	0.099 (0.720)	1.104	0.192 (1.390)	1.212
Household Income $125-$150k	0.164 (1.080)	1.178	0.042 (0.270)	1.043
Household Size=1	0.469 (0.820)	1.598	-0.421 (0.730)	0.656
Household Size=2	0.187 (0.410)	1.206	-0.057 (0.130)	0.945
Household Size=3	0.330 (0.730)	1.391	-0.045 (0.100)	0.956
Household Size=4	0.308 (0.680)	1.361	0.071 (0.160)	1.074
Household Size=5	0.354 (0.780)	1.425	0.142 (0.320)	1.153
Household Size=6	0.449 (0.880)	1.567	-0.107 (0.210)	0.899

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.328	0.720	-0.082	0.921
	(0.840)		(0.210)	
Household Vehicles=2	-0.213	0.808	-0.243	0.784
	(0.970)		(1.090)	
Household Vehicles=3	-0.264	0.768	-0.237	0.789
	(1.230)		(1.090)	
Household Vehicles=4	-0.351	0.704	-0.118	0.889
	(1.500)		(0.500)	
Licensed Drivers in Household=1	0.131	1.140	0.535	1.707
	(0.250)		(1.010)	
Licensed Drivers in Household=2	-0.203	0.816	0.279	1.322
	(0.570)		(0.770)	
Licensed Drivers in Household=3	-0.360	0.698	0.216	1.241
	(1.030)		(0.610)	
Licensed Drivers in Household=4	-0.269	0.764	-0.172	0.842
	(0.750)		(0.470)	
Male	0.281	1.324	0.513	1.670
	(3.11)**		(5.58)**	
Daily Miles Driven, Less than 20	0.169	1.184	0.036	1.037
	(0.570)		(0.120)	
Daily Miles Driven, 20-30	0.221	1.247	-0.064	0.938
	(0.740)		(0.210)	
Daily Miles Driven, 31-40	0.150	1.162	-0.100	0.905
	(0.500)		(0.330)	
Daily Miles Driven, 41-50	0.073	1.076	-0.250	0.779
	(0.230)		(0.800)	
Daily Miles Driven, 51-60	0.188	1.207	-0.206	0.814
	(0.600)		(0.650)	
Daily Miles Driven, 61-70	0.295	1.343	-0.085	0.919
	(0.840)		(0.240)	
Daily Miles Driven, 71-80	0.046	1.047	-0.314	0.731
	(0.120)		(0.850)	
Daily Miles Driven, 81-90	0.202	1.224	0.248	1.281
	(0.480)		(0.570)	
Daily Miles Driven, 91-100	-0.030	0.970	-0.357	0.700
	(0.080)		(0.900)	
Importance of Fuel Economy rated 2 (7 =very important)	0.453	1.573	0.668	1.950
	(1.000)		(1.460)	
Importance of Fuel Economy rated 3 (7 =very important)	0.352	1.422	0.453	1.573
	(0.820)		(1.050)	
Importance of Fuel Economy rated 4 (7 =very important)	0.383	1.467	0.495	1.640
	(0.950)		(1.220)	
Importance of Fuel Economy rated 5 (7 =very important)	0.315	1.370	0.686	1.986
	(0.780)		(1.680)	
Importance of Fuel Economy rated 6 (7 =very important)	0.481	1.618	0.582	1.790
	(1.170)		(1.400)	
Importance of Fuel Economy rated 7 (7 =very important)	0.306	1.358	0.573	1.774
	(0.720)		(1.350)	

EPA Fuel Economy Label Choice Models

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.311	1.365	-0.143	0.867
	(1.090)		(0.490)	
Importance of Fuel Economy Label=3	-0.071	0.931	-0.163	0.850
	(0.270)		(0.600)	
Importance of Fuel Economy Label=4	-0.149	0.862	-0.253	0.776
	(0.590)		(0.980)	
Importance of Fuel Economy Label=5	-0.107	0.899	-0.266	0.766
	(0.420)		(1.030)	
Importance of Fuel Economy Label=6	-0.046	0.955	-0.152	0.859
	(0.170)		(0.570)	
Importance of Fuel Economy Label=7	0.013	1.013	-0.284	0.753
	(0.050)		(1.000)	
Vehicles considered=Sports Car	-0.186	0.830	-0.153	0.858
	(1.340)		(1.110)	
Vehicles considered=Subcompact Car	0.022	1.022	-0.067	0.935
	(0.120)		(0.360)	
Vehicles considered=Compact Car	0.206	1.229	0.213	1.237
	(1.720)		(1.750)	
Vehicles considered=Midsized Car	0.048	1.049	-0.002	0.998
	(0.520)		(0.020)	
Vehicles considered=Large Car	0.133	1.142	0.115	1.122
	(0.910)		(0.770)	
Vehicles considered=Station Wagon	0.265	1.303	0.674	1.962
	(1.290)		(2.96)**	
Vehicles considered=SUV	0.049	1.050	0.112	1.119
	(0.520)		(1.170)	
Vehicles considered=Crossover	0.043	1.044	0.031	1.031
	(0.420)		(0.300)	
Vehicles considered=Pickup Truck	0.042	1.043	-0.035	0.966
	(0.300)		(0.240)	
Vehicles considered=Mini-Van	0.068	1.070	0.057	1.059
	(0.440)		(0.350)	
Vehicles considered=Van	-0.120	0.887	0.795	2.214
	(0.290)		(1.730)	
Vehicles considered=Other	-0.277	0.758	-0.136	0.873
	(0.980)		(0.490)	
Early Adopter=2 (1 is first to adopt)	0.125	1.133	0.349	1.418
	(0.610)		(1.700)	
Early Adopter=3 (1 is first to adopt)	0.302	1.353	0.638	1.893
	(1.540)		(3.22)**	
Early Adopter=4 (1 is first to adopt)	0.124	1.132	0.424	1.528
	(0.640)		(2.19)*	
Early Adopter=5 (1 is first to adopt)	0.178	1.195	0.462	1.587
	(0.890)		(2.32)*	
Early Adopter=6 (1 is first to adopt)	0.054	1.055	0.376	1.456
	(0.240)		(1.680)	
Early Adopter=7 (1 is first to adopt)	-0.181	0.834	0.002	1.002
	(0.620)		(0.010)	
Observations	2389		2376	

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
+ significant at 10%; ** significant at 5%; * si

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	0.087 (0.120)	1.091	-0.555 (0.800)	0.574
Label 1 Dummy Variable	-0.120 (1.180)	0.887	0.091 (0.880)	1.095
Label 2 Dummy Variable	0.282 (2.56)*	1.326	0.471 (4.35)**	1.602
City Miles Share of Miles (e.g., 1-100)	0.001 (0.650)	1.001	-0.003 (1.320)	0.997
Age 18-24	-0.289 (0.900)	0.749	-0.391 (1.220)	0.676
Age 25-34	-0.206 (0.960)	0.814	-0.377 (1.810)	0.686
Age 35-44	-0.171 (0.800)	0.843	-0.291 (1.400)	0.748
Age 45-54	-0.361 (1.780)	0.697	-0.130 (0.660)	0.878
Age 55-64	-0.152 (0.770)	0.859	-0.140 (0.740)	0.869
Less than High School	-0.757 (0.970)	0.469	-0.746 (0.970)	0.474
High School	0.055 (0.300)	1.057	-0.593 (3.19)**	0.553
Some College	-0.122 (0.990)	0.885	-0.231 (1.890)	0.794
College	0.041 (0.360)	1.042	-0.022 (0.200)	0.978
Household Income Less Than $15k	-1.050 (2.40)*	0.350	-0.390 (0.880)	0.677
Household Income $15-$25k	-0.863 (2.12)*	0.422	-0.310 (0.740)	0.733
Household Income $25-$50k	-0.186 (0.910)	0.830	-0.317 (1.530)	0.728
Household Income $50-$75k	0.093 (0.570)	1.097	-0.126 (0.790)	0.882
Household Income $75-$100k	-0.046 (0.330)	0.955	0.050 (0.360)	1.051
Household Income $100-$125k	-0.046 (0.330)	0.955	0.001 0.000	1.001
Household Income $125-$150k	0.047 (0.300)	1.048	-0.020 (0.130)	0.980
Household Size=1	-0.159 (0.270)	0.853	-0.385 (0.660)	0.680
Household Size=2	-0.386 (0.820)	0.680	-0.540 (1.190)	0.583
Household Size=3	-0.294 (0.630)	0.745	-0.373 (0.830)	0.689
Household Size=4	-0.267 (0.570)	0.766	-0.303 (0.680)	0.739
Household Size=5	-0.474 (1.010)	0.623	-0.403 (0.890)	0.668
Household Size=6	0.119 (0.220)	1.126	-0.550 (1.080)	0.577

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.161	0.851	-0.386	0.680
	(0.400)		(0.980)	
Household Vehicles=2	-0.438	0.645	-0.252	0.777
	(1.890)		(1.140)	
Household Vehicles=3	-0.332	0.717	-0.273	0.761
	(1.460)		(1.250)	
Household Vehicles=4	-0.136	0.873	-0.280	0.756
	(0.550)		(1.180)	
Licensed Drivers in Household=1	-0.026	0.974	1.316	3.728
	(0.050)		(2.46)*	
Licensed Drivers in Household=2	0.328	1.388	0.959	2.609
	(0.880)		(2.57)*	
Licensed Drivers in Household=3	0.474	1.606	1.000	2.718
	(1.290)		(2.73)**	
Licensed Drivers in Household=4	0.014	1.014	0.714	2.042
	(0.040)		(1.910)	
Male	0.484	1.623	0.415	1.514
	(5.17)**		(4.51)**	
Daily Miles Driven, Less than 20	-0.134	0.875	-0.067	0.935
	(0.440)		(0.230)	
Daily Miles Driven, 20-30	-0.209	0.811	-0.170	0.844
	(0.670)		(0.570)	
Daily Miles Driven, 31-40	-0.177	0.838	-0.299	0.742
	(0.570)		(0.980)	
Daily Miles Driven, 41-50	-0.121	0.886	-0.219	0.803
	(0.380)		(0.700)	
Daily Miles Driven, 51-60	-0.179	0.836	-0.173	0.841
	(0.540)		(0.540)	
Daily Miles Driven, 61-70	-0.277	0.758	-0.341	0.711
	(0.770)		(0.960)	
Daily Miles Driven, 71-80	-0.224	0.799	0.032	1.033
	(0.590)		(0.080)	
Daily Miles Driven, 81-90	-0.290	0.748	-0.216	0.806
	(0.670)		(0.500)	
Daily Miles Driven, 91-100	-0.570	0.566	-0.809	0.445
	(1.420)		(1.99)*	
Importance of Fuel Economy rated 2 (7 =very important)	0.611	1.842	-0.180	0.835
	(1.350)		(0.400)	
Importance of Fuel Economy rated 3 (7 =very important)	0.066	1.068	-0.364	0.695
	(0.160)		(0.860)	
Importance of Fuel Economy rated 4 (7 =very important)	0.189	1.208	-0.278	0.757
	(0.480)		(0.710)	
Importance of Fuel Economy rated 5 (7 =very important)	0.329	1.390	-0.036	0.965
	(0.830)		(0.090)	
Importance of Fuel Economy rated 6 (7 =very important)	0.561	1.752	-0.156	0.856
	(1.380)		(0.390)	
Importance of Fuel Economy rated 7 (7 =very important)	0.375	1.455	-0.205	0.815
	(0.900)		(0.500)	

EPA Fuel Economy Label Choice Models

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.215 (0.750)	1.240	0.036 (0.130)	1.037
Importance of Fuel Economy Label=3	0.453 (1.690)	1.573	0.114 (0.430)	1.121
Importance of Fuel Economy Label=4	0.360 (1.420)	1.433	0.076 (0.300)	1.079
Importance of Fuel Economy Label=5	0.262 (1.030)	1.300	-0.139 (0.540)	0.870
Importance of Fuel Economy Label=6	0.188 (0.710)	1.207	-0.156 (0.590)	0.856
Importance of Fuel Economy Label=7	0.371 (1.320)	1.449	-0.229 (0.810)	0.795
Vehicles considered=Sports Car	-0.020 (0.140)	0.980	-0.101 (0.730)	0.904
Vehicles considered=Subcompact Car	0.045 (0.230)	1.046	0.390 (2.08)*	1.477
Vehicles considered=Compact Car	0.248 (1.99)*	1.281	0.308 (2.51)*	1.361
Vehicles considered=Midsized Car	0.164 (1.740)	1.178	0.256 (2.74)**	1.292
Vehicles considered=Large Car	-0.207 (1.400)	0.813	-0.023 (0.160)	0.977
Vehicles considered=Station Wagon	0.368 (1.660)	1.445	0.060 (0.280)	1.062
Vehicles considered=SUV	0.027 (0.280)	1.027	0.176 (1.830)	1.192
Vehicles considered=Crossover	0.027 (0.260)	1.027	0.385 (3.70)**	1.470
Vehicles considered=Pickup Truck	0.275 (1.860)	1.317	0.159 (1.110)	1.172
Vehicles considered=Mini-Van	0.038 (0.240)	1.039	0.381 (2.36)*	1.464
Vehicles considered=Van	-0.013 (0.030)	0.987	-1.060 (2.32)*	0.346
Vehicles considered=Other	0.548 (1.830)	1.730	0.230 (0.820)	1.259
Early Adopter=2 (1 is first to adopt)	0.060 (0.280)	1.062	0.461 (2.19)*	1.586
Early Adopter=3 (1 is first to adopt)	0.081 (0.400)	1.084	0.569 (2.82)**	1.766
Early Adopter=4 (1 is first to adopt)	0.073 (0.370)	1.076	0.529 (2.67)**	1.697
Early Adopter=5 (1 is first to adopt)	0.024 (0.120)	1.024	0.514 (2.52)*	1.672
Early Adopter=6 (1 is first to adopt)	-0.102 (0.450)	0.903	0.390 (1.700)	1.477
Early Adopter=7 (1 is first to adopt)	-0.107 (0.370)	0.899	0.331 (1.130)	1.392
Observations	2398		2378	

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
+ significant at 10%; ** significant at 5%; * si

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle		Selected Gasoline Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	0.192 (0.260)	1.212	1.106 (1.540)	3.022
Label 1 Dummy Variable	0.470 (4.12)**	1.600	0.003 (0.030)	1.003
Label 2 Dummy Variable	-0.120 (1.060)	0.887	0.362 (3.17)**	1.436
City Miles Share of Miles (e.g., 1-100)	-0.007 (3.01)**	0.993	-0.004 (1.660)	0.996
Age 18-24	-0.488 (1.450)	0.614	-0.590 (1.740)	0.554
Age 25-34	-0.515 (2.27)*	0.598	-0.947 (4.36)**	0.388
Age 35-44	-0.213 (0.930)	0.808	-0.547 (2.58)*	0.579
Age 45-54	0.020 (0.090)	1.020	-0.506 (2.52)*	0.603
Age 55-64	0.014 (0.070)	1.014	-0.511 (2.65)**	0.600
Less than High School	0.120 (0.140)	1.127	0.838 (1.080)	2.312
High School	-0.077 (0.390)	0.926	0.022 (0.110)	1.022
Some College	-0.103 (0.770)	0.902	0.092 (0.700)	1.096
College	-0.122 (1.020)	0.885	0.056 (0.470)	1.058
Household Income Less Than $15k	0.340 (0.680)	1.405	-0.174 (0.370)	0.840
Household Income $15-$25k	-0.007 (0.020)	0.993	-0.144 (0.320)	0.866
Household Income $25-$50k	0.286 (1.300)	1.331	-0.263 (1.170)	0.769
Household Income $50-$75k	0.238 (1.390)	1.269	-0.167 (0.970)	0.846
Household Income $75-$100k	0.080 (0.550)	1.083	0.029 (0.200)	1.029
Household Income $100-$125k	0.252 (1.670)	1.287	0.059 (0.400)	1.061
Household Income $125-$150k	0.043 (0.260)	1.044	0.019 (0.110)	1.019
Household Size=1	0.053 (0.090)	1.054	0.387 (0.630)	1.473
Household Size=2	-0.012 (0.030)	0.988	0.134 (0.280)	1.143
Household Size=3	0.025 (0.050)	1.025	0.392 (0.810)	1.480
Household Size=4	-0.073 (0.160)	0.930	0.073 (0.150)	1.076
Household Size=5	0.356 (0.750)	1.428	0.229 (0.470)	1.257
Household Size=6	-0.185 (0.350)	0.831	-0.344 (0.600)	0.709

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle		Selected Gasoline Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	0.648 (1.510)	1.912	0.536 (1.350)	1.709
Household Vehicles=2	0.356 (1.490)	1.428	-0.266 (1.170)	0.766
Household Vehicles=3	0.127 (0.550)	1.135	-0.347 (1.550)	0.707
Household Vehicles=4	0.203 (0.800)	1.225	-0.363 (1.480)	0.696
Licensed Drivers in Household=1	0.504 (0.910)	1.655	-0.256 (0.460)	0.774
Licensed Drivers in Household=2	0.609 (1.620)	1.839	0.057 (0.150)	1.059
Licensed Drivers in Household=3	0.799 (2.16)*	2.223	0.051 (0.130)	1.052
Licensed Drivers in Household=4	0.686 (1.820)	1.986	0.302 (0.780)	1.353
Male	0.135 (1.350)	1.145	0.190 (1.940)	1.209
Daily Miles Driven, Less than 20	-0.470 (1.350)	0.625	-1.099 (3.69)**	0.333
Daily Miles Driven, 20-30	-0.228 (0.650)	0.796	-0.812 (2.70)**	0.444
Daily Miles Driven, 31-40	-0.286 (0.800)	0.751	-1.034 (3.38)**	0.356
Daily Miles Driven, 41-50	-0.169 (0.460)	0.845	-1.050 (3.31)**	0.350
Daily Miles Driven, 51-60	-0.154 (0.410)	0.857	-0.977 (3.03)**	0.376
Daily Miles Driven, 61-70	0.150 (0.360)	1.162	-1.317 (3.55)**	0.268
Daily Miles Driven, 71-80	-0.219 (0.510)	0.803	-0.686 (1.840)	0.504
Daily Miles Driven, 81-90	0.303 (0.580)	1.354	-0.311 (0.740)	0.733
Daily Miles Driven, 91-100	0.568 (1.110)	1.765	-0.373 (0.950)	0.689
Importance of Fuel Economy rated 2 (7 =very important)	-0.411 (0.870)	0.663	-0.460 (1.010)	0.631
Importance of Fuel Economy rated 3 (7 =very important)	0.253 (0.560)	1.288	-0.155 (0.360)	0.856
Importance of Fuel Economy rated 4 (7 =very important)	0.487 (1.150)	1.627	-0.343 (0.860)	0.710
Importance of Fuel Economy rated 5 (7 =very important)	0.358 (0.840)	1.430	-0.490 (1.220)	0.613
Importance of Fuel Economy rated 6 (7 =very important)	0.711 (1.630)	2.036	-0.611 (1.490)	0.543
Importance of Fuel Economy rated 7 (7 =very important)	0.443 (0.990)	1.557	-0.562 (1.330)	0.570

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle		Selected Gasoline Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	-0.046	0.955	-0.432	0.649
	(0.150)		(1.460)	
Importance of Fuel Economy Label=3	0.013	1.013	-0.348	0.706
	(0.040)		(1.280)	
Importance of Fuel Economy Label=4	-0.481	0.618	-0.355	0.701
	(1.690)		(1.370)	
Importance of Fuel Economy Label=5	-0.485	0.616	-0.307	0.736
	(1.690)		(1.180)	
Importance of Fuel Economy Label=6	-0.453	0.636	-0.394	0.674
	(1.510)		(1.450)	
Importance of Fuel Economy Label=7	-0.589	0.555	-0.660	0.517
	(1.880)		(2.25)*	
Vehicles considered=Sports Car	-0.014	0.986	0.051	1.052
	(0.090)		(0.340)	
Vehicles considered=Subcompact Car	0.145	1.156	0.152	1.164
	(0.710)		(0.770)	
Vehicles considered=Compact Car	-0.024	0.976	0.032	1.033
	(0.180)		(0.240)	
Vehicles considered=Midsized Car	-0.107	0.899	0.098	1.103
	(1.070)		(0.990)	
Vehicles considered=Large Car	0.052	1.053	0.055	1.057
	(0.320)		(0.350)	
Vehicles considered=Station Wagon	0.330	1.391	-0.019	0.981
	(1.380)		(0.080)	
Vehicles considered=SUV	-0.110	0.896	0.085	1.089
	(1.060)		(0.830)	
Vehicles considered=Crossover	0.081	1.084	0.206	1.229
	(0.720)		(1.870)	
Vehicles considered=Pickup Truck	0.129	1.138	0.160	1.174
	(0.820)		(1.060)	
Vehicles considered=Mini-Van	-0.189	0.828	0.199	1.220
	(1.110)		(1.180)	
Vehicles considered=Van	-0.219	0.803	-0.358	0.699
	(0.510)		(0.760)	
Vehicles considered=Other	-0.193	0.824	-0.246	0.782
	(0.660)		(0.770)	
Early Adopter=2 (1 is first to adopt)	0.280	1.323	0.373	1.452
	(1.300)		(1.630)	
Early Adopter=3 (1 is first to adopt)	0.068	1.070	0.137	1.147
	(0.330)		(0.620)	
Early Adopter=4 (1 is first to adopt)	0.597	1.817	0.389	1.476
	(2.92)**		(1.790)	
Early Adopter=5 (1 is first to adopt)	0.360	1.433	0.209	1.232
	(1.720)		(0.940)	
Early Adopter=6 (1 is first to adopt)	0.710	2.034	0.233	1.262
	(2.90)**		(0.930)	
Early Adopter=7 (1 is first to adopt)	0.034	1.035	0.642	1.900
	(0.110)		(2.09)*	
Observations	2404		2404	

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
+ significant at 10%; ** significant at 5%; * si

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle		Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	0.839 (1.220)	2.314	-1.669 (2.21)*	0.188
Label 1 Dummy Variable	0.088 (0.870)	1.092	-0.056 (0.530)	0.946
Label 2 Dummy Variable	0.377 (3.52)**	1.458	-0.055 (0.490)	0.946
City Miles Share of Miles (e.g., 1-100)	-0.001 (0.310)	0.999	0.007 (3.27)**	1.007
Age 18-24	-0.145 (0.460)	0.865	0.224 (0.700)	1.251
Age 25-34	-0.350 (1.700)	0.705	0.098 (0.460)	1.103
Age 35-44	-0.396 (1.930)	0.673	0.113 (0.530)	1.120
Age 45-54	-0.094 (0.490)	0.910	0.036 (0.180)	1.037
Age 55-64	-0.198 (1.060)	0.820	-0.317 (1.590)	0.728
Less than High School	-0.231 (0.320)	0.794	-0.142 (0.170)	0.868
High School	-0.055 (0.300)	0.946	0.253 (1.340)	1.288
Some College	-0.077 (0.630)	0.926	0.092 (0.710)	1.096
College	0.111 (1.010)	1.117	0.249 (2.14)*	1.283
Household Income Less Than $15k	-0.605 (1.360)	0.546	0.177 (0.400)	1.194
Household Income $15-$25k	-0.002 0.000	0.998	-0.210 (0.510)	0.811
Household Income $25-$50k	-0.186 (0.910)	0.830	-0.097 (0.460)	0.908
Household Income $50-$75k	-0.124 (0.790)	0.883	-0.123 (0.750)	0.884
Household Income $75-$100k	-0.058 (0.430)	0.944	-0.176 (1.220)	0.839
Household Income $100-$125k	0.001 0.000	1.001	-0.095 (0.660)	0.909
Household Income $125-$150k	-0.043 (0.280)	0.958	0.081 (0.510)	1.084
Household Size=1	0.190 (0.340)	1.209	0.866 (1.440)	2.377
Household Size=2	0.128 (0.290)	1.137	0.506 (1.040)	1.659
Household Size=3	0.274 (0.630)	1.315	0.415 (0.860)	1.514
Household Size=4	0.132 (0.300)	1.141	0.238 (0.490)	1.269
Household Size=5	0.225 (0.510)	1.252	0.173 (0.350)	1.189
Household Size=6	0.110 (0.220)	1.116	0.481 (0.890)	1.618

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle		Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.845 (2.09)*	0.430	-0.032 (0.080)	0.969
Household Vehicles=2	-0.391 (1.780)	0.676	0.241 (1.010)	1.273
Household Vehicles=3	-0.358 (1.660)	0.699	0.355 (1.520)	1.426
Household Vehicles=4	-0.399 (1.700)	0.671	-0.103 (0.400)	0.902
Licensed Drivers in Household=1	0.826 (1.580)	2.284	-0.622 (1.150)	0.537
Licensed Drivers in Household=2	0.072 (0.200)	1.075	-0.607 (1.620)	0.545
Licensed Drivers in Household=3	0.156 (0.440)	1.169	-0.455 (1.240)	0.634
Licensed Drivers in Household=4	-0.028 (0.080)	0.972	-0.367 (0.970)	0.693
Male	0.164 (1.800)	1.178	-0.089 (0.930)	0.915
Daily Miles Driven, Less than 20	-1.025 (3.35)**	0.359	0.296 (0.860)	1.344
Daily Miles Driven, 20-30	-0.761 (2.46)*	0.467	0.360 (1.040)	1.433
Daily Miles Driven, 31-40	-1.023 (3.27)**	0.360	0.242 (0.690)	1.274
Daily Miles Driven, 41-50	-1.298 (4.02)**	0.273	0.523 (1.460)	1.687
Daily Miles Driven, 51-60	-0.865 (2.64)**	0.421	0.430 (1.180)	1.537
Daily Miles Driven, 61-70	-1.106 (3.05)**	0.331	0.199 (0.490)	1.220
Daily Miles Driven, 71-80	-0.573 (1.520)	0.564	0.223 (0.530)	1.250
Daily Miles Driven, 81-90	-0.795 (1.850)	0.452	0.342 (0.710)	1.408
Daily Miles Driven, 91-100	-0.275 (0.680)	0.760	0.096 (0.210)	1.101
Importance of Fuel Economy rated 2 (7 =very important)	-0.428 (0.960)	0.652	0.723 (1.540)	2.061
Importance of Fuel Economy rated 3 (7 =very important)	0.014 (0.030)	1.014	0.077 (0.170)	1.080
Importance of Fuel Economy rated 4 (7 =very important)	-0.204 (0.520)	0.815	0.303 (0.720)	1.354
Importance of Fuel Economy rated 5 (7 =very important)	-0.321 (0.810)	0.725	0.254 (0.600)	1.289
Importance of Fuel Economy rated 6 (7 =very important)	-0.161 (0.400)	0.851	0.030 (0.070)	1.030
Importance of Fuel Economy rated 7 (7 =very important)	-0.442 (1.070)	0.643	0.233 (0.520)	1.262

EPA Fuel Economy Label Choice Models

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle		Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	-0.132	0.876	-0.052	0.949
	(0.460)		(0.180)	
Importance of Fuel Economy Label=3	-0.273	0.761	-0.139	0.870
	(1.030)		(0.500)	
Importance of Fuel Economy Label=4	-0.022	0.978	-0.118	0.889
	(0.090)		(0.440)	
Importance of Fuel Economy Label=5	-0.135	0.874	-0.039	0.962
	(0.530)		(0.150)	
Importance of Fuel Economy Label=6	-0.276	0.759	-0.043	0.958
	(1.040)		(0.160)	
Importance of Fuel Economy Label=7	-0.270	0.763	-0.062	0.940
	(0.960)		(0.210)	
Vehicles considered=Sports Car	-0.118	0.889	0.072	1.075
	(0.850)		(0.510)	
Vehicles considered=Subcompact Car	0.155	1.168	-0.131	0.877
	(0.850)		(0.680)	
Vehicles considered=Compact Car	0.138	1.148	0.099	1.104
	(1.150)		(0.790)	
Vehicles considered=Midsized Car	0.041	1.042	0.169	1.184
	(0.450)		(1.760)	
Vehicles considered=Large Car	-0.039	0.962	-0.220	0.803
	(0.270)		(1.380)	
Vehicles considered=Station Wagon	-0.029	0.971	-0.242	0.785
	(0.140)		(1.050)	
Vehicles considered=SUV	0.003	1.003	-0.040	0.961
	(0.030)		(0.400)	
Vehicles considered=Crossover	0.411	1.508	-0.221	0.802
	(4.02)**		(2.00)*	
Vehicles considered=Pickup Truck	0.068	1.070	-0.087	0.917
	(0.480)		(0.580)	
Vehicles considered=Mini-Van	0.093	1.097	-0.111	0.895
	(0.590)		(0.650)	
Vehicles considered=Van	-0.116	0.890	0.350	1.419
	(0.280)		(0.850)	
Vehicles considered=Other	0.208	1.231	0.284	1.328
	(0.760)		(1.010)	
Early Adopter=2 (1 is first to adopt)	0.375	1.455	0.200	1.221
	(1.780)		(0.920)	
Early Adopter=3 (1 is first to adopt)	0.323	1.381	0.125	1.133
	(1.610)		(0.600)	
Early Adopter=4 (1 is first to adopt)	0.517	1.677	-0.048	0.953
	(2.61)**		(0.230)	
Early Adopter=5 (1 is first to adopt)	0.242	1.274	0.068	1.070
	(1.180)		(0.320)	
Early Adopter=6 (1 is first to adopt)	0.327	1.387	0.100	1.105
	(1.430)		(0.420)	
Early Adopter=7 (1 is first to adopt)	0.451	1.570	0.194	1.214
	(1.560)		(0.650)	
Observations	2400		2404	

Absolute value of z statistics in parentheses
* significant at 5%; ** significant at 1%
+ significant at 10%; ** significant at 5%; * si

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Constant	-0.324 (1.160)	0.723
Label 1 Dummy Variable	-0.119 (2.89)**	0.888
Label 2 Dummy Variable	0.232 (5.30)**	1.261
City Miles Share of Miles (e.g., 1-100)	-0.001 (1.330)	0.999
Age 18-24	-0.161 (1.270)	0.851
Age 25-34	-0.069 (0.820)	0.933
Age 35-44	-0.099 (1.180)	0.906
Age 45-54	-0.065 (0.820)	0.937
Age 55-64	0.038 (0.490)	1.039
Less than High School	-0.621 (2.04)*	0.537
High School	-0.252 (3.46)**	0.777
Some College	-0.136 (2.74)**	0.873
College	-0.025 (0.550)	0.975
Household Income Less Than $15k	-0.294 (1.680)	0.745
Household Income $15-$25k	-0.573 (3.43)**	0.564
Household Income $25-$50k	-0.109 (1.330)	0.897
Household Income $50-$75k	0.057 (0.890)	1.059
Household Income $75-$100k	0.053 (0.960)	1.054
Household Income $100-$125k	0.091 (1.620)	1.095
Household Income $125-$150k	0.115 (1.830)	1.122
Household Size=1	-0.073 (0.320)	0.930
Household Size=2	-0.183 (1.020)	0.833
Household Size=3	-0.038 (0.210)	0.963
Household Size=4	-0.046 (0.260)	0.955
Household Size=5	-0.062 (0.340)	0.940
Household Size=6	0.020 (0.100)	1.020

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.269 (1.680)	0.764
Household Vehicles=2	-0.286 (3.16)**	0.751
Household Vehicles=3	-0.270 (3.04)**	0.763
Household Vehicles=4	-0.240 (2.49)*	0.787
Licensed Drivers in Household=1	0.708 (3.33)**	2.030
Licensed Drivers in Household=2	0.531 (3.64)**	1.701
Licensed Drivers in Household=3	0.526 (3.68)**	1.692
Licensed Drivers in Household=4	0.343 (2.35)*	1.409
Male	0.390 (10.46)**	1.477
Daily Miles Driven, Less than 20	-0.025 (0.210)	0.975
Daily Miles Driven, 20-30	-0.072 (0.590)	0.931
Daily Miles Driven, 31-40	-0.146 (1.180)	0.864
Daily Miles Driven, 41-50	-0.079 (0.620)	0.924
Daily Miles Driven, 51-60	-0.069 (0.530)	0.933
Daily Miles Driven, 61-70	-0.210 (1.460)	0.811
Daily Miles Driven, 71-80	-0.152 (1.000)	0.859
Daily Miles Driven, 81-90	-0.221 (1.280)	0.802
Daily Miles Driven, 91-100	-0.286 (1.780)	0.751
Importance of Fuel Economy rated 2 (7 =very important)	0.254 (1.400)	1.289
Importance of Fuel Economy rated 3 (7 =very important)	-0.036 (0.210)	0.965
Importance of Fuel Economy rated 4 (7 =very important)	0.083 (0.520)	1.087
Importance of Fuel Economy rated 5 (7 =very important)	0.192 (1.190)	1.212
Importance of Fuel Economy rated 6 (7 =very important)	0.189 (1.150)	1.208
Importance of Fuel Economy rated 7 (7 =very important)	0.059 (0.350)	1.061

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.123 (1.050)	1.131
Importance of Fuel Economy Label=3	0.067 (0.620)	1.069
Importance of Fuel Economy Label=4	-0.028 (0.270)	0.972
Importance of Fuel Economy Label=5	-0.035 (0.340)	0.966
Importance of Fuel Economy Label=6	0.018 (0.160)	1.018
Importance of Fuel Economy Label=7	0.003 (0.030)	1.003
Vehicles considered=Sports Car	-0.133 (2.39)*	0.875
Vehicles considered=Subcompact Car	0.121 (1.590)	1.129
Vehicles considered=Compact Car	0.240 (4.85)**	1.271
Vehicles considered=Midsized Car	0.109 (2.91)**	1.115
Vehicles considered=Large Car	0.032 (0.540)	1.033
Vehicles considered=Station Wagon	0.118 (1.370)	1.125
Vehicles considered=SUV	0.059 (1.530)	1.061
Vehicles considered=Crossover	0.154 (3.65)**	1.166
Vehicles considered=Pickup Truck	0.059 (1.020)	1.061
Vehicles considered=Mini-Van	0.136 (2.11)*	1.146
Vehicles considered=Van	-0.342 (2.05)*	0.710
Vehicles considered=Other	0.254 (2.23)*	1.289
Early Adopter=2 (1 is first to adopt)	0.122 (1.460)	1.130
Early Adopter=3 (1 is first to adopt)	0.297 (3.72)**	1.346
Early Adopter=4 (1 is first to adopt)	0.196 (2.50)*	1.217
Early Adopter=5 (1 is first to adopt)	0.183 (2.27)*	1.201
Early Adopter=6 (1 is first to adopt)	0.121 (1.330)	1.129
Early Adopter=7 (1 is first to adopt)	-0.116 (1.000)	0.890
Observations	14,281	

Absolute value of z statistics in parentheses

* significant at 5%; ** significant at 1%

+ significant at 10%; ** significant at 5%; * si